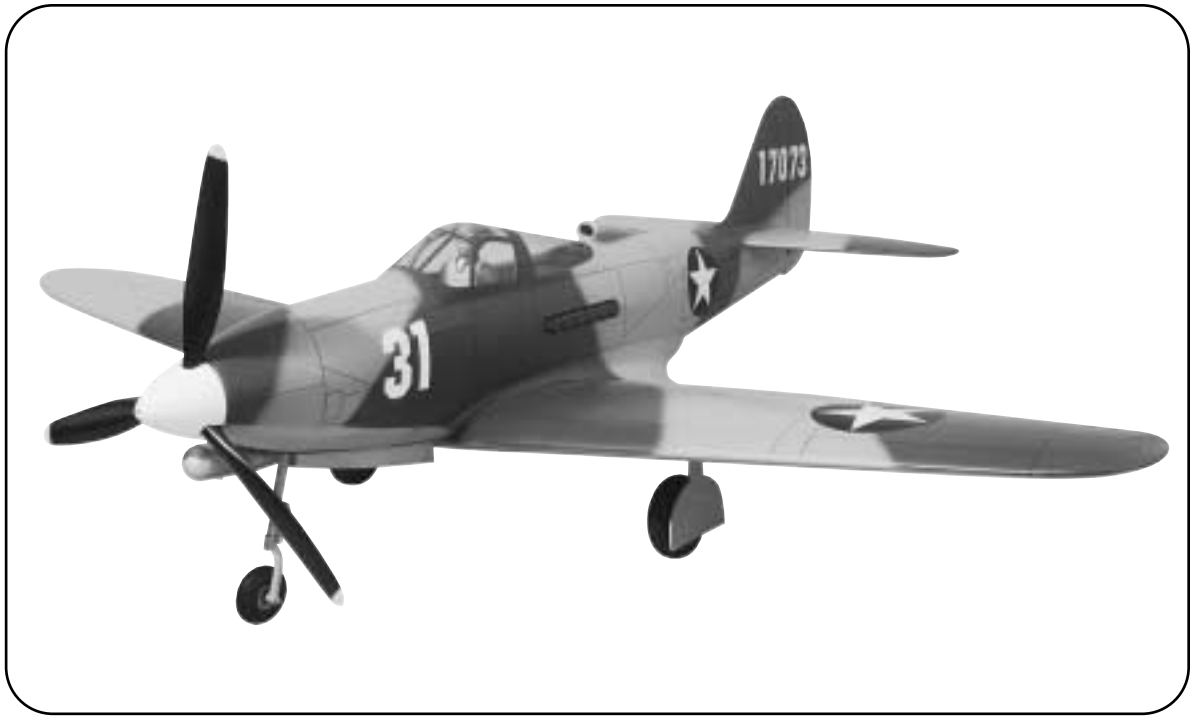
TOP FLITE® P-39 AIRACOBRA™

GOLD EDITION

MADE IN USA



Wingspan
63” [1600mm]

Wing Area
742.8 sq in [47.9sq. dm.]

Weight
8 - 10 lbs
[3629 - 4536 grams]

Wing Loading
24.8 - 31.0 oz./sq.ft.
[76 - 95 g/sq. dm.]

Fuselage Length
55.25” [1403.5mm]

WARRANTY..... Top Flite Models guarantees this kit to be free of defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Top Flite’s liability exceed the original cost of the purchased kit. Further, Top Flite reserves the right to change or modify this warranty without notice. In that Top Flite has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product the user accepts all resulting liability. **If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to immediately return this kit in new and unused condition to the place of purchase.**

Top Flite Models P.O. Box 788 Urbana, Il 61803 **Technical Assistance Call (217)398-8970 www.top-flite.com**

READ THROUGH THIS INSTRUCTION BOOK FIRST. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.

Entire Contents © Copyright 1999

TABLE OF CONTENTS AND BUILDING SEQUENCE

INTRODUCTION 3
PRECAUTIONS 3
DECISIONS YOU MUST MAKE 3
- Engine selection 3
- Retractable landing gear 3
- Flaps 4
- Propellers 4

COMPETITION-MINDED MODELERS 4
DOCUMENTATION 4
POWER 4
FLIGHT CHARACTERISTICS 4
OTHER ITEMS REQUIRED 5
BUILDING SUPPLIES 5
- Glue & Filler 5
- Tools 5

DIE-CUT PATTERNS ..... 6&7
IMPORTANT BUILDING NOTES 8
GET READY TO BUILD 8
BUILD THE TAIL SURFACES 9
- Make the stab skins 9
- Build the stabilizer 10
- Build the elevators 11
- Build the fin and rudder 13

BUILD THE FUSELAGE 15
- Frame the fuselage top 15
- Mount the stab and fin 17
- Sheet the top of the fuselage 18
- Build the bottom of the fuselage 20
- Install the pushrods 21
- Install the engine 23
- Retract installation (nose gear) 24

BUILD THE WING 25
- Build the wing panels 26
- Retract installation (main gears) 28
- Sheet the bottom of the wing 29
- Installing the aileron servos 29
- Joining the wing halves 30
- Install the ailerons 31
- Build the flaps 31
- Sheet the top of the wing 33
- Fit the wing to the fuselage 35

FINISH THE LOWER FUSELAGE 36
- Nose Gear Steering
- Pull-pull system installation (Retracts only) ... 36
- Canopy installation 38
- Cowling installation 38
- Mount the receiver and battery 39

FINISHING 39
- Prepare the model for covering 39
- Balance the airplane laterally 40
- Cover your model with MonoKote® 40
- Covering sequence 41
- Painting 41
- Join the control surfaces 41

FINISHING TOUCHES 42
- Decals 42
- Panel lines 42

GET YOUR MODEL READY TO FLY 42
- Balance your model 42
- Final hookups and checks 43
- Control surface throws 43

PREFLIGHT 43
- Identify your model 43
- Charge your batteries 43
- Balance your propeller 43
- Ground check your model 44
- Range check your radio 44

ENGINE SAFETY PRECAUTIONS 44
AMA SAFETY CODE 44
FLYING 45
- Takeoff 45
- Flight 45
- Landing 45
- Two-View Drawing ..... Back Cover

PROTECT YOUR MODEL, YOURSELF & OTHERS FOLLOW THIS IMPORTANT SAFETY PRECAUTION

Your P-39 Airacobra is not a toy, but a sophisticated working model that functions very much like an actual airplane. Because of its realistic performance, if you do not assemble and operate your P-39 Airacobra correctly, you could possibly injure yourself or spectators and damage property.

To make your R/C modeling experience totally enjoyable, get assistance with assembly and your first flights from an experienced, knowledgeable modeler. You'll learn faster and avoid risking your model before you're truly ready to solo. Your local hobby shop has information about flying clubs in your area whose membership includes qualified instructors.

You can also contact the Academy of Model Aeronautics (AMA), which has more than 2,500 chartered clubs across the country. We recommend you join the AMA which will insure you at AMA club sites and events. AMA Membership is required at chartered club fields where qualified flight instructors are available.

Contact the AMA at the address or toll-free phone number below.

AMA
SINCE 1936

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302
(800) 435-9262
Fax (765) 741-0057

or via the Internet at: http://www.modelaircraft.org

Your Top Flite Gold Edition P-39 Airacobra is intended for scale and general sport flying including **mild** aerobatics such as loops, stall turns, rolls, etc. Its structure is designed to withstand such stresses. If you intend to use your Airacobra for more abusive types of flying such as racing or aggressive aerobatics it is your responsibility to reinforce areas of the model that will be subjected to the resulting unusually high stresses.

INTRODUCTION

Congratulations and thank you for purchasing the Top Flite Gold Edition P-39 Airacobra. We are sure you are eager to build and fly your P-39 Airacobra just as we were eager to build and fly our prototypes.

The nice thing about the Gold Edition P-39 Airacobra is that although it is a highly detailed scale model with all the goodies, such as a realistic looking scale outline, built up tail surfaces, retracts and flaps, it is one of the few military aircraft that had a tricycle gear configuration. Those of you who have not yet mastered airplanes that are tail draggers, will appreciate this model's great ground handling characteristics.

One last note before you continue: we highly recommend you get some pictures or a book about P-39 Airacobras or send for your documentation package as soon as possible. This way you can study the drawings and photos to get a feel for how your P-39 Airacobra should look when you're done. This will also help you figure out what scale details to add and decide on a trim scheme.

Well, this should be enough to get your juices flowing, so get your other projects off your workbench, say goodbye to your significant other for a while and...keep reading!

NOTE: We, as the kit manufacturer, provide you with a top quality kit and great instructions, but ultimately the quality and flyability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model.

Please inspect all parts carefully before you start to build! If any parts are missing, broken or defective, or if you have any questions about building or flying this model, please call us at (217) 398-8970 or e-mail us at www.top-flite.com and we'll be glad to help. If you are calling for replacement parts, please look up the part numbers and the kit identification number (stamped on the end of the carton) and have them ready when you call.

PRECAUTIONS

1.You must build the plane according to the plan and instructions. **Do not alter or modify the model**, as doing so may result in an unsafe or unflyable model. **In a few cases the plan and instructions may differ slightly from the photos. In those instances you should assume the plan and written instructions are correct**.

2.You **must** take time to build **straight, true** and **strong**.

3. You **must use a proper R/C radio** that is in first class condition, the correct sized engine and correct components (fuel tank, wheels, etc.) throughout your building process.

4. You **must properly install all R/C and other components** so that the model operates properly on the ground and in the air.

5. You **must test the operation of the model before every flight** to insure that all equipment is operating and you must make certain that the model has remained structurally sound.

6. If you are not already an experienced R/C pilot, you must **fly** the model **only with the help** of a competent, experienced R/C pilot.

Remember: Take your time and follow instructions to end up with a well-built model that is straight and true.

DECISIONS YOU MUST MAKE

ENGINE SELECTION

Recommended engine size:

.61 to .75 cu. in. [10cc to 13cc] **2-stroke**
.70 to .91 cu. in. [12cc to 16cc] **4-stroke**

Your Top Flite Gold Edition P-39 Airacobra will perform well with any of the engines within the recommended range. We flew our prototype with the O.S.® 61FX and had more than ample power. With a larger engine you will most likely find yourself throttling back to achieve scale-like speeds for level flight but will have plenty of extra power to vertically climb away from the pursuing enemy aircraft.

RETRACTABLE LANDING GEAR

You may build your P-39 Airacobra either with fixed or retractable landing gear. All the hardware you need for fixed gear is supplied with this kit. We do, however, provide detailed instructions on how to install retractable landing gear available from Robart. They are pneumatic to simplify installation and hookup. You may choose to use another type of retract but it is up to you to make modifications required to fit them. For Retractable Landing Gear you will need these items:

- ❑ 85 degree Main gear #606HD (ROBQ0006)
- ❑ 105 degree Nose gear #TFP39 (ROBQ1660)
- ❑ Robart #188VR Variable rate air control kit (ROBQ2302)
- ❑ Extra air tubing (ROBQ2363)
- ❑ Robart #164G Hand pump w/gauge (ROBQ2388)
- ❑ Quick disconnects (ROBQ2395)
- ❑ (4) #4 Flat washers (GPMQ3402)
- ❑ Pull-Pull kit (SULQ3121)
- ❑ Main gear strut covers (ROBQ2703)
- ❑ Standard servo to operate air control valve
- ❑ (4) 3/16" [4.8mm] Wheel collars (GPMQ4308)
- ❑ (2) 3/16" [4.8mm] Adjustable axle (GPMQ4282)

Flaps

Your P-39 Airacobra is designed to incorporate scale split flaps; however, flaps are **optional** and not necessary for an excellent flying experience. Without flaps, the takeoff roll is a bit longer and the landing speed is slightly faster. If you do not wish to build the flaps, just disregard parts of the manual involving flap construction.

The flaps are not difficult to build, but they do require good craftsmanship to fit and operate well. Flaps add nicely to the model's flight characteristics and scale appearance. Trim changes were not needed for our prototype when flaps were extended. The only exception was when they were deployed when flying at full power. The trim corrections are discussed later in the manual during radio set up and you will find more information on the use of the flaps in the *flying* section.

For flaps you will need one additional standard servo.

PROPELLERS

We did our test flying using Top Flite® Power Point™ Propellers and an OS .61FX engine. Initial test flights were with the 12x6 and 12x8. As with any model, you may experiment with different propellers to find out what type and pitch works best for you.

COMPETITION-MINDED MODELERS

We designed our P-39 Airacobra from scale three-view drawings supplied by Scale Model Research (address follows) and photos taken of various P-39 Airacobras. The scale of your Gold Edition P-39 Airacobra is 1 to 6.5.

If you plan to enter your P-39 Airacobra in scale competition, this kit qualifies for Fun Scale and the Sportsman and Expert classes in Sport Scale. Fun Scale and Sport Scale have the same flight requirements where you must perform ten maneuvers, five of which are mandatory. The other five are up to you–easy stuff like cycling your landing gear, a slow, low "inspection pass" with flaps extended, or maybe a touch-and-go. If you have never competed in a scale contest, you could start out in Fun Scale. In Fun Scale, the only documentation you need for static judging is any proof that a full size aircraft of this type, in the paint/markings scheme on your model, did exist. A single photo, a kit box cover, even a painting is sufficient proof! If you're interested, contact the AMA for a rule book which will tell you everything you need to know. Look in the back of the AMA magazine (Model Aviation) for a schedule of events.

If you are not concerned with a scale trim scheme you can make a variation of the one on the box, or design your own. If you are going to compete in scale competition use the photos in your documentation package as a guide for your trim scheme.

DOCUMENTATION

Three view drawings and photo packs of full size P-39 Airacobras are available from:

Scale Model Research
3114 Yukon Ave, Costa Mesa, CA 92626
(714) 979-8058
Fax: (714) 979-7279

SCALE ACCURACY

The Top Flite P-39 Airacobra is a faithful reproduction of the full size aircraft, with a few exceptions:

1. The size of the horizontal stab / elevators has been increased by about 10% to improve pitch stability.
2. The size of the vertical fin / rudder has been increased by about 10% to improve yaw stability.
3. The position of the retractable landing gear has been moved 1/2" [13mm] aft to allow a scale 4" [100mm] wheel to clear the wing spar.

POWER

With the .61 2-stroke engine the model will fly very well. The .61 will provide more power than the model needs for a scale speed, but you will appreciate the extra power when vertical maneuvers are being performed.

FLIGHT CHARACTERISTICS

During our flight testing we found no bad characteristics in this airplane. Take-offs were straightforward with good ground handling. The plane was airborne in approximately 100' [30m]. Once the plane is flying it goes exactly where you point it. Rolls are very scale-like with the low rate settings. At high rate it can roll more like an aerobatic sport plane. Power-off stalls were very soft and predictable with only the nose dropping in the stall. There was no tendency for the plane to tip stall. Landings were straightforward with or without the flaps. Without flaps you should maintain a bit more airspeed on your approach. With full flap deployment the plane slows very nicely and allows for a very soft landing. Unlike some models, the P-39 Airacobra does not exhibit any pronounced ballooning when flaps are deployed. A full flap landing will generally require a little steeper approach than an approach without flaps. Try setting up your approach from a slightly higher altitude than you might typically use for a landing without flaps. Deploy full flaps and gradually decrease the power. Keep the nose down and maintain a consistent approach to the beginning of the runway. When you are over the runway threshold pull off all power and the plane will settle in nicely to final touchdown. **If you have never flown with flaps this is an excellent model to learn with**. The extra effort to construct the P-39 Airacobra with flaps is well worth the effort when the model is completed.

OTHER ITEMS REQUIRED

These are additional items you will need to complete your P-39 Airacobra that are not included with your kit. Order numbers are in parentheses (GPMQ4130). Our exclusive brand is listed where possible: **TOP** is the Top Flite® brand, **GPM** is the Great Planes® brand, and **HCA** is the Hobbico® brand.

❏ 4 to 6 Channel radio with 5 to 7 servos

❏ Engine

O.S. Engines	**Prop**
.61 FX 2-stroke	12 x 6, 13 x 6
FS .70 Surpass 4-stroke	13 x 8

Super Tigre®	**Prop**
G-75 2-stroke	12 x 8, 13 x 8
G-90 2 stroke	14 x 6, 15 x 6-10

❏ Propellers appropriate for your engine
❏ (1) Muffler extension (engine to muffler) (for .61FX OSMG2582)
❏ (2) 4" [100mm] Main wheels (ROBQ1518)
❏ (1) 2-1/2" [64mm] Nose wheel (ROBQ1512)
❏ (2) 3/16" [4.8mm] Wheel collars (GPMQ4309)
❏ (4) 5/32" [4mm] Wheel collars (GPMQ4306)
❏ (1) 12 oz. [360cc] Fuel tank (GPMQ4105)
❏ (1) Y-connector for Aileron servos
❏ (2) 6" [152mm] Servo extensions (1-aileron, 1-flap)
❏ (1) 24" [610mm] Servo extension for battery
❏ Approximately 12" [300mm] Medium silicone fuel tubing (GPMQ4131)
❏ (1) Fuel filler valve (GPMQ4160)
❏ (1) 3-1/2" [89mm] Spinner (CBAQ5430)
❏ 1/2" [13mm] (HCAQ1050) or 1/4" [6mm] (HCAQ1000) R/C Foam rubber padding
❏ (3) rolls of Top Flite Super MonoKote® covering
❏ (1) 1/7 Scale pilot figure (TOPQ9000)
❏ (1) Fuel drop tank (TOPQ7900)

BUILDING SUPPLIES

Here's a checklist of supplies you should have on hand while you're building. Some of these are optional. Use your own experience to decide what you need. We recommend Great Planes Pro™ CA and Epoxy.

GLUE/FILLER

❏ 4 oz. [120g] Thin CA (GPMR6004)
❏ 2 oz. [60g] Medium CA (GPMR6009)
❏ 2 oz. [60g] Thick CA (GPMR6015)
❏ CA Accelerator (GPMR6035)
❏ CA Debonder (GMPR6039)
❏ CA Applicator tips (HCAR3780)
❏ 30-minute (GPMR6047)
or
❏ 45-minute (GPMR6048) Epoxy
❏ 6-minute Epoxy (GPMR6045)
❏ 4 oz. [120g] Pro wood glue (GPMR6161)
❏ Lightweight hobby filler (balsa color, HCAR3401)

TOOLS

❏ #11 Blades (HCAR0311, 100 qty.)
❏ Single edge razor blades (HCAR0312, 100 qty.)
❏ Razor plane (MASR1510)
❏ Hobbico builder's triangle (HCAR0480)
❏ T-Pins (HCAR5100 (S), HCAR5150 (M), HCAR5200 (L)
❏ Drill bits:

1/16" [1.6mm]	**3/32**" [2.4mm] (or #**41**)
9/64" [3.6mm] (or **1/8**")	**5/32**" [4.0mm]
1/4" [6.4mm]	**3/16**" [4.8mm] (or #**10**)

❏ 1/4-20 Tap and drill (GPMR8105)
❏ 6-32 Tap and drill (GPMR8102)
❏ 8-32 Tap and drill (GPMR8103)
❏ Tap wrench (GPMR8120)
❏ Curved tip scissors (HCAR0667)
❏ Great Planes plan protector (GPMR6167) or wax paper
❏ Masking tape (TOPR8018)
❏ Easy-Touch™ bar sanders
❏ Dremel® #178 cutting bit for countersinking screws in the servo hatch covers (DRER1178)

RECOMMENDED COVERING TOOLS AND ACCESSORIES

❏ Top Flite Heat Gun (TOPR2000)
❏ Top Flite Trim Seal Tool (TOPR2200)
-and-
❏ Top Flite Sealing Iron (TOPR2100)
❏ Top Flite Hot Sock™ (TOPR2175)
-or-
❏ 21st Century® Sealing Iron (COVR2700)
❏ 21st Century Cover Sock (COVR2702)

EASY-TOUCH™ BAR SANDER

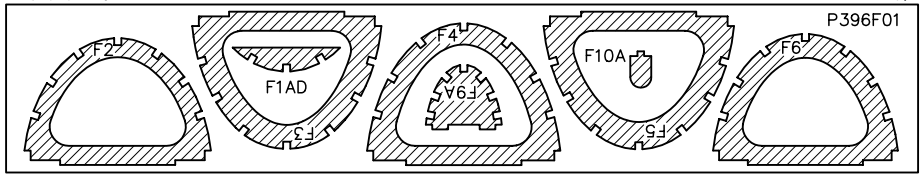
A flat, durable, easy to handle sanding tool is a necessity for building a well finished model. Great Planes makes a complete range of **Easy-Touch Bar Sanders** (patented) and replaceable **Easy-Touch Adhesive-backed Sandpaper**. While building the P-39 we used two 5-1/2" [140mm] Bar Sanders and two 11" [280mm] Bar Sanders equipped with 80-grit and 150-grit Adhesive-backed Sandpaper. Here's the complete list of Easy-Touch Bar Sanders and Adhesive Backed Sandpaper.

5-1/2" [140mm] Bar Sander (GPMR6169)
11" [280mm] Bar Sander (GPMR6170)
22" [560mm] Bar Sander (GPMR6172)
33" [840mm] Bar Sander (GPMR6174)
44" [1120mm] Bar Sander (GPMR6176)
11" [280mm] Contour Multi-Sander (GPMR6190)

(continued on page 8)

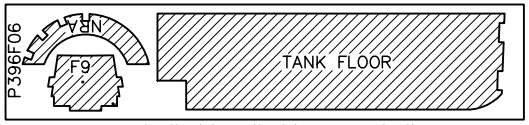
DIE-CUT PATTERNS

P396F01 1 REQ.



1/8" X 4-3/8" X 23-3/4"

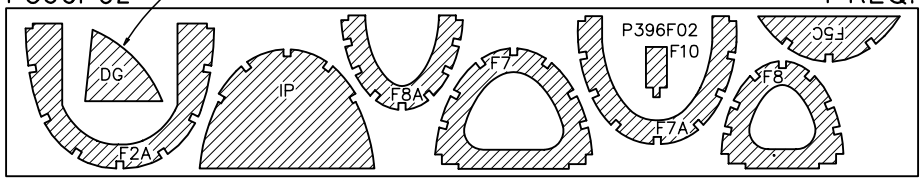
P396F06 1 REQ.



1/8" X 3" X 13-1/2"

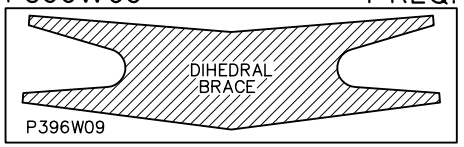
P396F02 1 REQ.

DIHEDRAL GAUGE



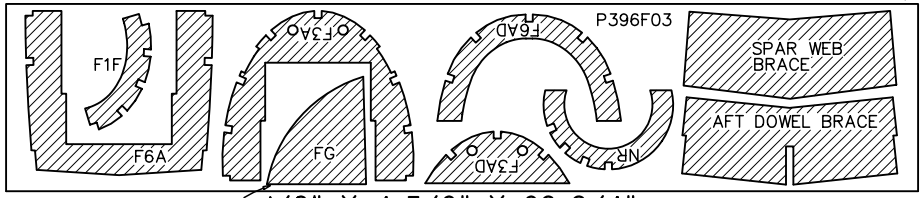
1/8" X 4-3/8" X 23-3/4"

P396W09 1 REQ.



1/16" X 3-1/2" X 11-3/4"

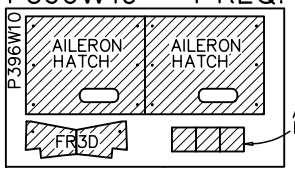
P396F03 1 REQ.



FIREWALL GAUGE

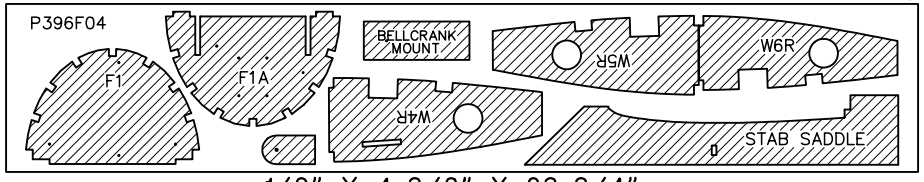
1/8" X 4-7/8" X 23-3/4"

P396W10 1 REQ.



1/16" X 4-1/8" X 7-1/4"

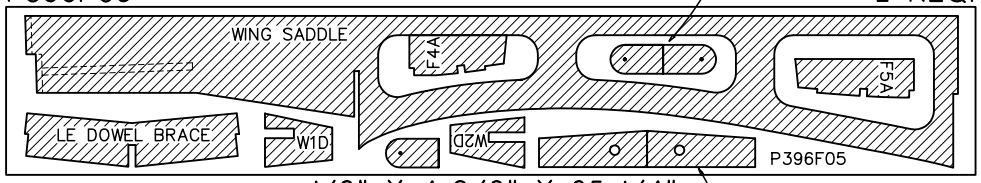
P396F04 2 REQ.



1/8" X 4-3/8" X 23-3/4"

P396F05 2 REQ.

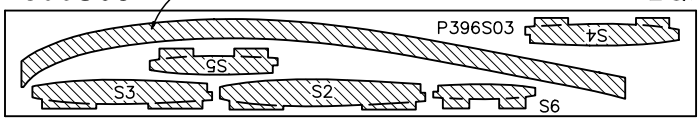
PUSHROD GUIDES



1/8" X 4-3/8" X 25-1/4"

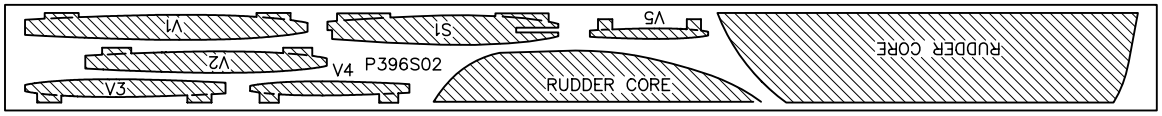
WING BOLT PLATES

P396S03 WING SADDLE DOUBLER 2 REQ.



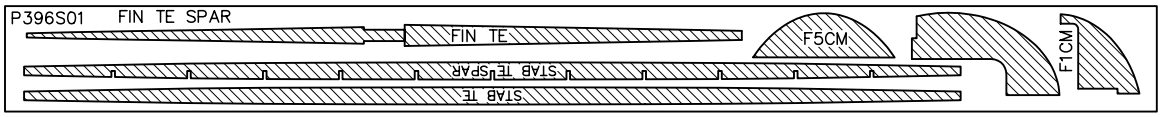
3/32" X 2-3/4" X 18"

P396S02 1 REQ.



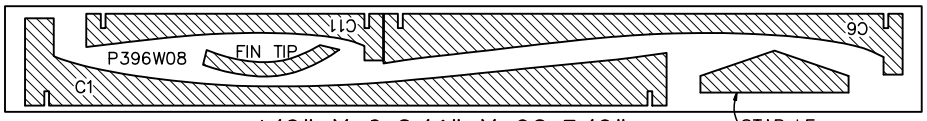
3/32" X 2-3/4" X 30"

P396S01 1 REQ.



1/8" X 2-3/4" X 30"

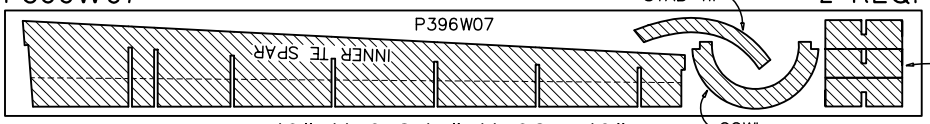
P396W08 1 REQ.



1/8" X 2-3/4" X 23-7/8"

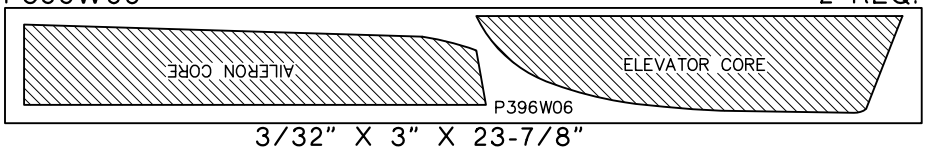
STAB LE BRACE

P396W07 2 REQ.



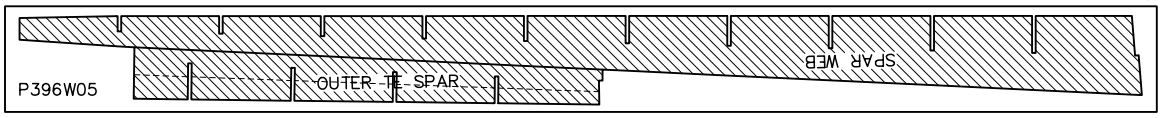
1/8" X 2-3/4" X 23-7/8"

P396W06 2 REQ.



3/32" X 3" X 23-7/8"

P396W05 2 REQ.

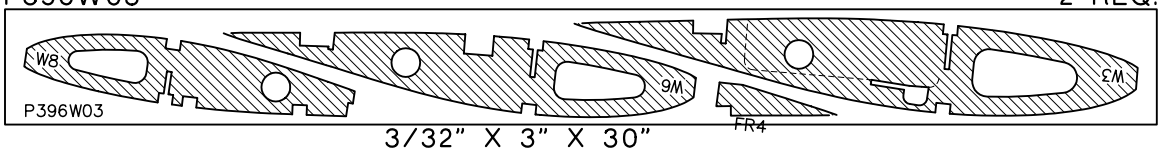


1/8" X 2-3/4" X 30"

P396W04 2 REQ.

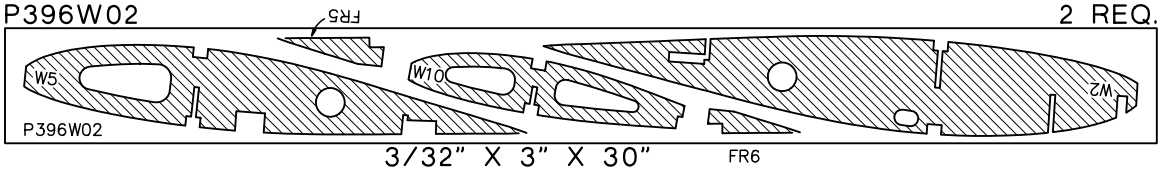
3/32" X 3" X 30"

P396W03 2 REQ.



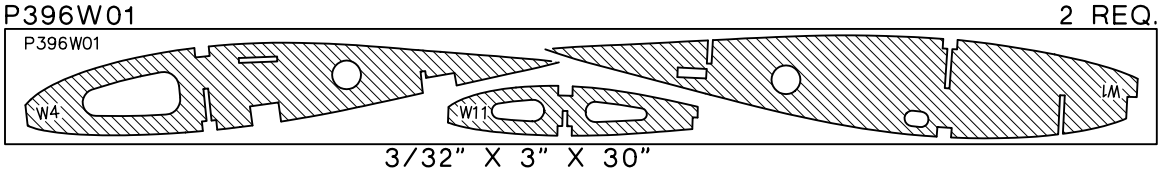
3/32" X 3" X 30"

P396W02 2 REQ.



3/32" X 3" X 30" FR6

P396W01 2 REQ.



3/32" X 3" X 30"

(continued from page 5)

12' [300mm] roll of Adhesive-backed sandpaper:
80-grit (GPMR6180)
150-grit (GPMR6183)
180-grit (GPMR6184)
220-grit (GPMR6185)

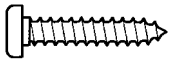
Assortment pack of 5-1/2" [140mm] strips (GPMR6189)

We also use Top Flite 320-grit (TOPR8030, 4 sheets) and 400-grit (TOPR8032, 4 sheets) wet-or-dry sandpaper for finish sanding.

IMPORTANT BUILDING NOTES

There are two types of screws used in this kit:
Sheet metal screws are designated by a number and a length.

For example #6 x 3/4" [19.1mm]



Machine screws are designated by a number, threads per inch and a length.

For example 4-40 x 3/4" [19.1mm]

When you see the ***term test*** fit in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or custom fit the part as necessary for the best fit.

Whenever the term ***glue*** is used you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step we will tell you what type of glue to use.

Whenever just **epoxy** is specified you may use **either** 30-minute epoxy ***or*** 6-minute epoxy. When 30-minute epoxy is **specified** it is **highly recommended** that you use only 30-minute (or 45-minute) epoxy because you will need the working time and/or the additional strength.

Occasionally we refer to the *top* or *bottom* of the model or *up* or *down*. To avoid confusion, the top or bottom of the model is as it would be when the airplane is right side up and will be referred to as the top even if the model is upside down during that step, i.e. the top main spar is always the top main spar even if the wing is upside down when you are working on it. Similarly, *move the former up* means move the former toward the top of the fuselage even if the fuselage is upside down when you are working on it.

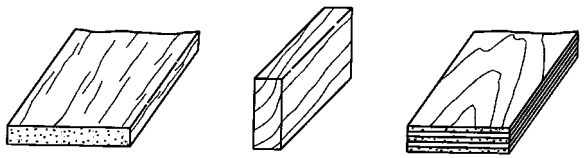
When you get to each step, read that step **completely through to the end** before you begin. Frequently there is important information or a note at the end of the step that you need to know before you start.

Photos and **sketches** are placed **ahead** of the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.

COMMON ABBREVIATIONS

Deg = degrees	Elev = elevator
Fuse = fuselage	" = inches
LE = leading edge	Ply = plywood
Stab = stabilizer	TE = trailing edge
LG = landing gear	mm = millimeters

TYPES OF WOOD



BALSA BASSWOOD PLYWOOD

Metric Conversion Chart

1” = 25.4mm (conversion factor)

1/64" = .4mm	1" = 25.4mm
1/32" = .8mm	2" = 50.8mm
1/16" = 1.6mm	3" = 76.2mm
3/32" = 2.4mm	6" = 152.4mm
1/8" = 3.2mm	12" = 304.8mm
5/32" = 4mm	15" = 381mm
3/16" = 4.8mm	18" = 457.2mm
1/4" = 6.4mm	21" = 533.4mm
3/8" = 9.5mm	24" = 609.6mm
1/2" = 12.7mm	30" = 762mm
5/8" = 15.9mm	36" = 914.4mm
3/4" = 19mm	

Note: An inch/mm scale is provided on the fuselage plan.

GET READY TO BUILD

1. Unroll the plan sheets. Roll them inside out so they lie flat.

2. Remove all the parts from the box. Use a ballpoint pen (not a felt tip pen) to lightly write the **name** or **size** on each piece so you can identify it later. Use the **die-cut patterns** on pages 6 and 7, to identify and mark the die-cut parts **before** you remove them from their die sheets. Many of the parts already have numbers stamped on them, but in some cases the number is located alongside the parts or only on the die drawings. You may remove all the die-cut parts from their die sheets now or wait until you need them. If a part is difficult to remove, don't force it out but cut around it with a #11 blade. After you remove the parts from their die sheets, lightly sand the edges to remove slivers or die-cutting irregularities. Save some of the larger leftover pieces of wood.

3. Separate the parts into groups such as **stab**, **fin**, **wing**, and fuse. Store smaller parts in zipper-top food storage bags.

BUILD THE TAIL SURFACES

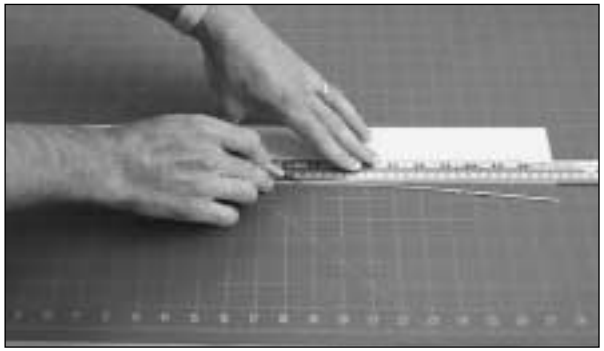
MAKE THE STAB SKINS

❑ 1. Use the ***Hot Tip*** that follows or your own method to glue two 1/16" x 3" x 30" [1.6 x 76 x 762mm] balsa sheets together to make a 1/16" x 6" x 30" [1.6 x 152 x 762mm] sheet for one of the **stab skins**.

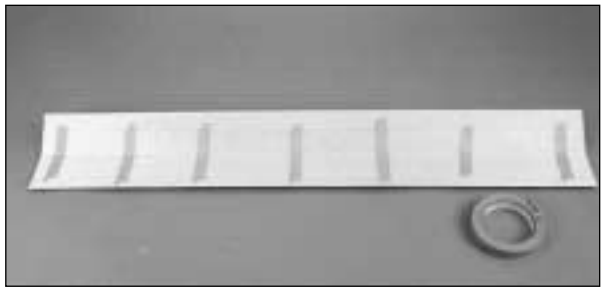
Top Flite selects balsa that is intended for sheeting, though occasionally a few of these sheets may have a small nick or split near the ends. If your kit contains a few of these sheets, arrange them and glue them together so the defects will not interfere with the final shape of the skin.

HOT TIP

HOW TO MAKE THE STAB SKINS

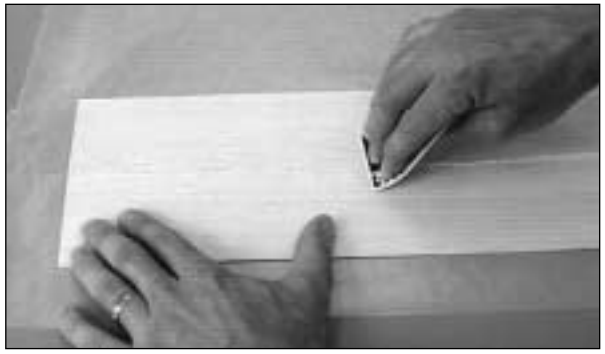


A. Use a straightedge and a sharp #11 blade to true one edge of both sheets. Do not cut all the way through the first time but make several passes with your knife to prevent the wood from splitting.

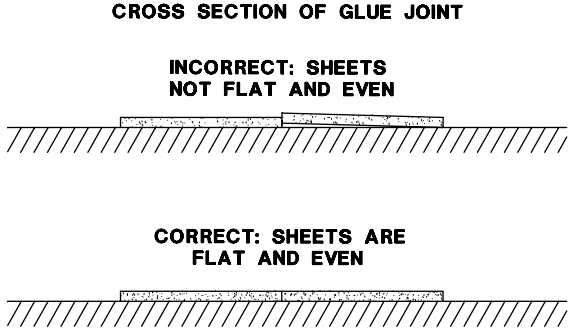


B. Tightly tape the trued edges of the sheets together with masking tape.

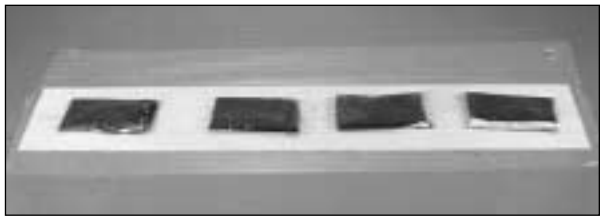
C. Place a sheet of Plan Protector or wax paper on your workbench. Turn the taped together sheets over and apply aliphatic resin (wood workers glue such as Great Planes Pro) to the seams.



D. Use a credit card or something similar to simultaneously press the sheets flat as you squeegee the excess glue from the seam. Wipe the glue off your squeegee so it's ready for the next time. Immediately proceed to the next step.



E. Inspect the seam and press the sheets together where they do not align.

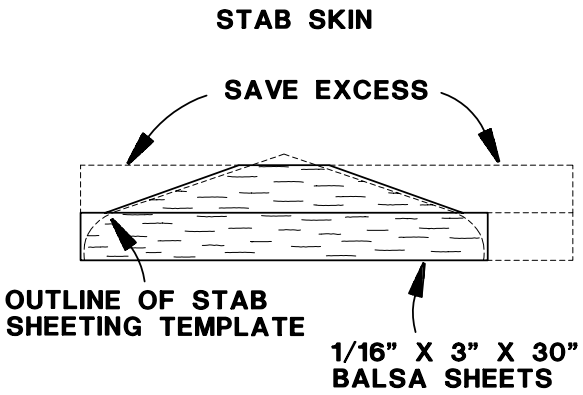


F. Place weights on top of the sheets to hold them down. We prefer plastic bags filled with lead shot, but anything similar will do the job.

G. After the glue dries, remove the weights and masking tape. Sand the sheet flat with your bar sander and 150-grit sandpaper. The idea is to sand the sheeting **before** you glue it to the structure. This eliminates low spots that can occur over the ribs from excessive sanding.

This is the same procedure we recommend when it is time to make the wing and fuse skins.

❑ 2. Place one of the **balsa skins** over the stab plan and cut the sheeting as shown in the sketch below. Be sure to cut the balsa skins slightly larger than the plan to allow for positioning.

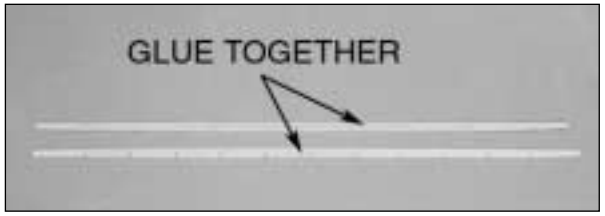


❑ 3. Use a small piece of the excess that you cut off to fill in the small area at the front of the stab skin.

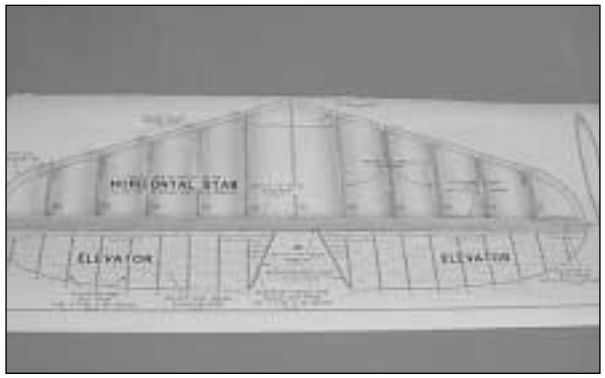
❑ 4. Cut a second skin to the same size and shape.

Build the stabilizer

❑ 1. Cut the stab plan along the dashed line and tape it to your building board. Cover the stab plan with Plan Protector.

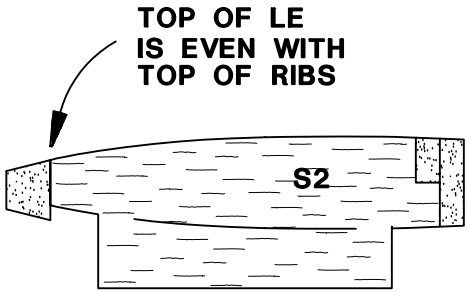


❑ 2. Glue the die-cut 1/8" [3.2mm] balsa **stab TE spar** to the die-cut 1/8" [3.2mm] balsa **stab TE**. These pieces are symmetrical so it does not matter how you join them.

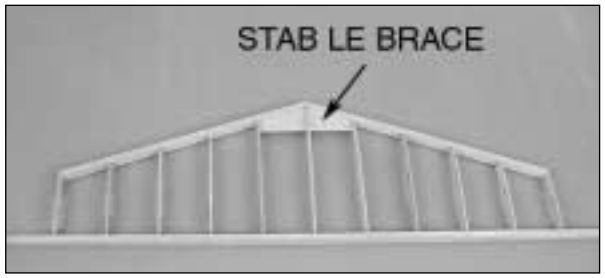


❑ 3. Insert all the die-cut 3/32" [2.4mm] balsa **stab ribs** except for rib S1 into the TE spar and place the assembly over the plan.

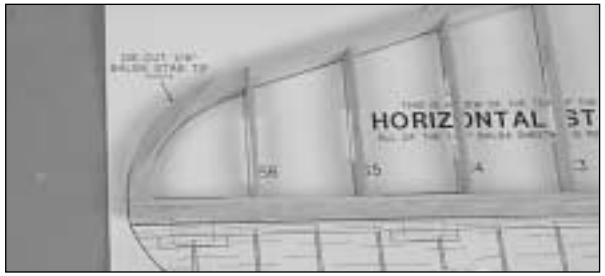
❑ 4. Make sure all the ribs are fully seated into the TE spar and that the jig tabs are contacting the building board. Use a square to make sure the TE is **perpendicular** to your building board. Glue the ribs to the TE with thin CA.



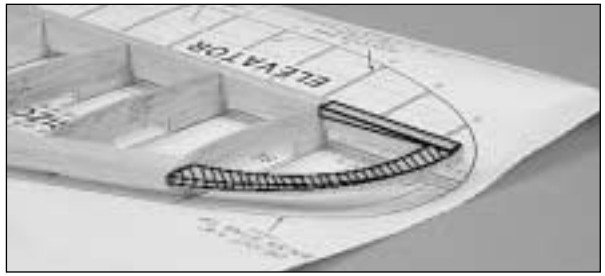
❑ 5. Sand a bevel on the front of the ribs to accommodate the aft sweep of the LE. Cut the 5/16" x 15" [7.9 x 381] **tapered balsa leading edge** at the angles shown on the plan. When you are satisfied with the fit, glue the leading edge to the front of the ribs. Be sure that the top of the tapered balsa leading edge is flush with the top of the ribs.



❑ 6. Fit the **Stab LE Brace** into the slot in rib **S1**. Test fit S1 and the stab brace as shown on the plan. When you are satisfied with the fit, glue S1 and the stab LE brace into position.



❑ 7. Glue the stab tips to the stab where shown on the plan. Make sure the tips are centered (vertically) on tip ribs S6 and the trailing edge.



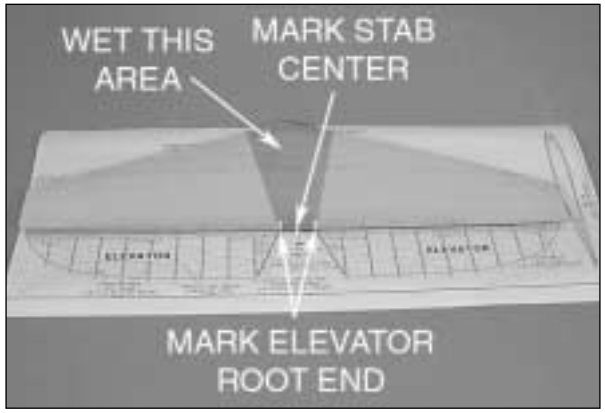
❑ 8. Relocate any T-pins that are protruding above the structure so they will not be in the way when you sand the stab tip and the leading and trailing edges. Use a bar sander and 80-grit sandpaper to bevel the top of the stab tips to accommodate the sheeting. Shape the top of the TE and LE to blend with the stab tips and the ribs. We've marked the centerline of the stab tip and highlighted the top of it so you can see how the stab tip is tapered.

HOT TIP

WEIGHT BAGS

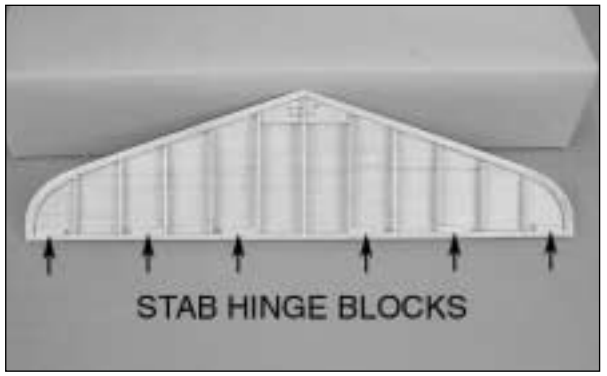
When we glue sheeting to a structure (wing, stab, fin), we use plastic bags filled with lead shot to hold the sheeting down. These plastic bags filled with lead take the shape of the curved surfaces to apply uniform pressure and do not put marks in the balsa wood. You can purchase lead shot at most stores where hunting supplies are sold. We use #6 lead shot. One 25 lb. [1.134kg] bag costs approximately fifteen to twenty dollars. You may use small zip lock food storage bags to hold the shot. Tape the bags shut to make sure they don't open. Each bag should hold between 2-3 lbs. [907-1361g.] of lead. Ten to fifteen 2-3 lbs. [907-1361g.] bags should be enough for most projects.

❏ 9. Before you sheet the top of the stab, refer to the photo at step 10. Use a ballpoint pen and a square to mark the center of the stab and the root end of both elevators on the TE of the stab. The marks will help you align the stab with the fuse and align the elevators with the stab later on.



❏ 10. Sheet the top of the stab with one of the **stab skins** you've already prepared. We recommend using aliphatic resin to glue the skin to the ribs and CA to glue the skin to the TE, LE and tips. Wet the outside of the sheeting in the middle near the leading edge. This will make the skin flexible enough to glue to the structure. Apply aliphatic resin to the ribs and position the top skin on the stab. Place your weights on top of the stab skin, then use CA to glue the skin to the LE, TE and tips. Leave the weights in position until the aliphatic resin dries. Thirty minutes to an hour is enough time.

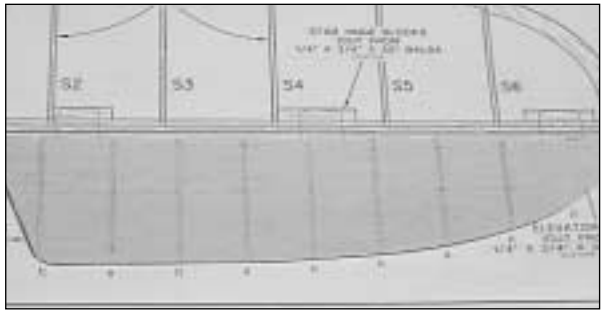
❏ 11. Remove the stab from your building board. Turn the stab over and cut the **jig tabs** from the bottom of the ribs, then trim the bottom of the LE even with the ribs. Trim the stab tips and the bottom of the TE near the tips the same way you did on the top.



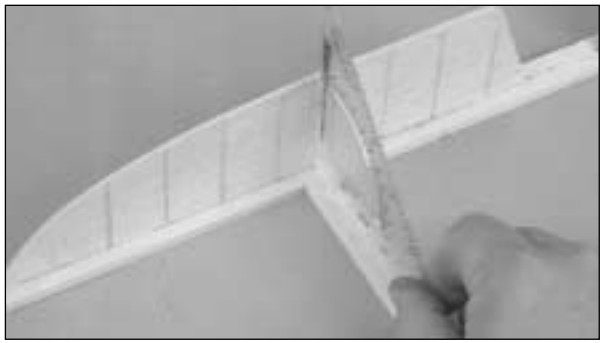
❏ 12. Cut the **stab hinge blocks** from one of the 1/4" x 3/4" x 30" [6.4 x 19.1 x 762mm] balsa sticks. Glue the hinge blocks to the TE, ribs, and top sheeting where shown on the plan. Trim the hinge blocks even with the TE and ribs.

❏ 13. Sheet the bottom of the stab with the other stab skin you prepared. Use care not to add any twist to the stab as it is no longer supported by the jig tabs. Once again, we suggest using aliphatic resin to glue the skin to the ribs and medium CA for the rest.

Build the elevators



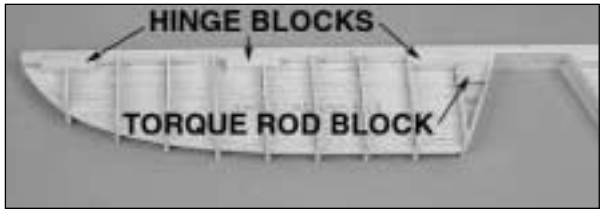
❏ ❏ 1. Mark the location of the **elevator ribs** on **both** sides of one of the die-cut 3/32" [2.4mm] balsa **elevator core** where shown on the plan. This is easy. Simply lay the die-cut core on the plan and draw a line from the "tick" marks at the leading and trailing edge of the elevator core. This will give you the positioning for the ribs. When you have completed one side transfer the lines to the other side.



❑ ❑ 2. Cut a 1/4" x 3/4" x 30" [6.4 x 19.1 x 762mm] balsa stick to the length shown on the plan for the **elevator leading edge**. Use a straightedge to draw a center line the length of the elevator leading edge. Glue the elevator core to the LE directly on top of the line so that the core will be centered on the LE. Use a square to make sure you glue the LE perpendicular to the elevator core.
Hint: Place a 1/4" [6.4mm] piece of balsa under the square to raise it to the level of the LE.

❑ ❑ 3. Make the **elevator hinge blocks** from a 1/4" x 5/16" x 24" [6.4 x 7.9 x 610mm] balsa stick. Glue the hinge blocks to the elevator as shown on the plan (Do this for the top and bottom of the elevator core). See photo at step 5.

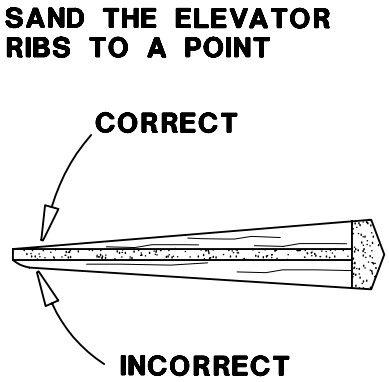
❑ ❑ 4. Make the **elevator torque rod blocks** from 1/4" x 5/16" x 24" [6.4 x 7.9 x 610mm] balsa. Glue the blocks to the elevator as shown on the plan. (Do this for the top and bottom of the elevator core.) See photo at step 5.



❑ ❑ 5. Use four 1/16" x 5/16" x 24" [6.4 x 7.9 x 610mm] balsa sticks to make the **elevator ribs**. Cut the sticks to the correct length, then glue them to the elevator core and the leading edge of the elevator.

❑ ❑ 6. Use a piece of leftover 1/16" [1.6mm] sheeting to make the **elevator root cap**. Glue the root cap into position.

❑ ❑ 7. Place the elevator on the stab TE and shape the elevator LE to match the shape of the stab TE.



❑ ❑ 8. Proceed slowly and carefully, shaping the elevator ribs and the hinge blocks to match the elevator LE and the cross section on the plan.

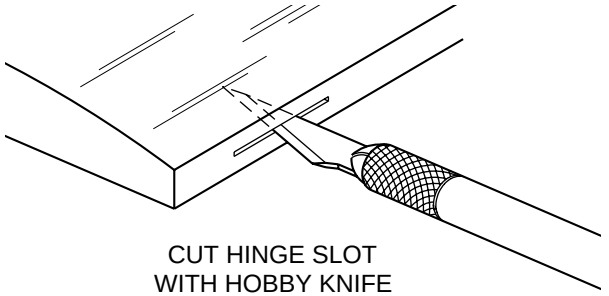
❑ ❑ 9. Insert two T-pins through the center of one of the elevator LE, near the tip and near the root. Place a straightedge across the T-pins and draw the centerline on the elevator LE with a ballpoint pen. Draw a centerline along the TE of the stab the same way.

❑ 10. Carefully cut away the center section of the elevator leading edge so the elevators match the shape as shown on the plan. Note which elevator matches which side of the stab.

IMPORTANT NOTES ABOUT CA HINGES

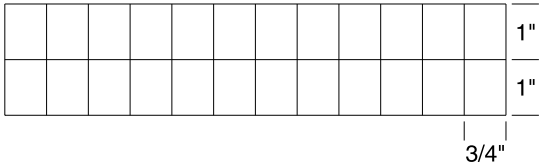
This kit is supplied with a CA hinge material consisting of a 3-layer lamination of Mylar and polyester. It is specially made for hinging model airplane control surfaces. When properly installed, this type of CA hinge provides the best combination of strength, durability and easy installation. We trust all of our Gold Edition war birds to these hinges, but **it is essential to install them correctly**. Carefully follow the hinging instructions in this manual for the best result.

The most common mistake made by modelers when installing CA hinges is making the hinge slots too tight restricting the flow of CA to the back of the hinges; or not using enough glue to fully secure the hinge over its entire surface area. This results in hinges that are only *tack glued* into the hinge slots. The techniques for cutting the hinge slots and gluing in CA hinges (near the end of the manual) have been developed to ensure thorough and secure gluing.



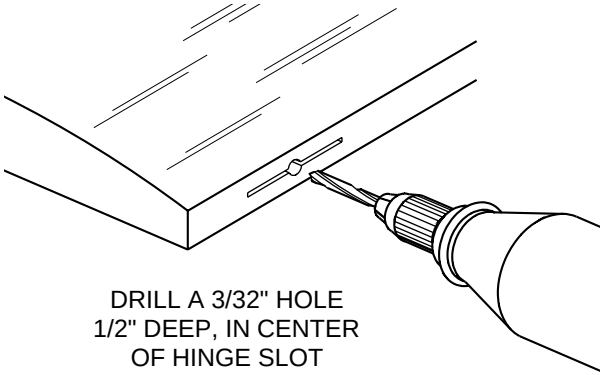
CUT HINGE SLOT
WITH HOBBY KNIFE
AND #11 BLADE

❑ ❑ 11. Mark the location of the hinge slots on the elevator and stab where shown on the plan. With a #11 blade, cut the hinge slots in the elevator and the stab along the centerlines you marked earlier.



❏ 12. Using the sketch above, cut six hinges from the CA hinge strip supplied with this kit. Snip the corners off so they go into the slots easier. You may cut all the hinges now, or cut them as you need them.

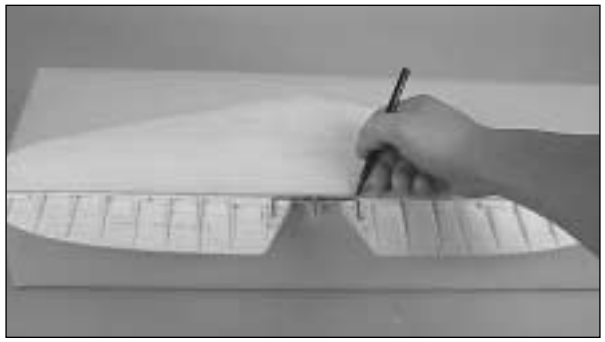
❏ ❏ 13. Test fit the hinges into the slots. If the hinges do not slide into the slots easily, work your knife blade back and forth in the slot a few times to provide more clearance (it is really the back edge of the blade that does the work here in widening the slot).



DRILL A 3/32" HOLE
1/2" DEEP, IN CENTER
OF HINGE SLOT

❏ ❏ 14. Drill a 3/32" [2.4mm] hole, 1/2" [12.7mm] deep in the center of the hinge slots. Use a rotary tool with a 3/32" [2.4mm] drill bit or a carbide cutter for the best results. Reinsert your knife blade to clean out the slot after you drill the holes.

❏ ❏ 15. Test fit the elevator to the stab with the hinges. If any hinge slots are not wide enough or are misaligned, make adjustments so the elevators accurately fit the stab.
Return to Step 1 and build the other elevator.



❏ 16. Determine which side of the stab looks the best. Designate that side as the top. Use a file or a rotary tool with a cut-off wheel to remove sharp edges or burrs on the ends of the **elevator joiner wire**. Place the horizontal Stab and elevators over the plan and position the elevator joiner wire on the top of the elevators in the location shown. Mark the leading edge of the elevators where the arm portion of the joiner wire will enter as shown on the plan.

❏ 17. Drill a 9/64" (or 1/8") [3.6mm] hole at the marks you made on the centerline of both elevator leading edges for the **joiner wire**. Cut a groove in the leading edge of both elevators to accommodate the joiner wire.
Hint: Use a 5/32" [4mm] brass tube sharpened at one end to cut the grooves.

❏ 18. Bevel the leading edges of the elevators to a "V" as shown in the cross section on the plan. Use the centerline on the elevator leading edges as a guide. Test fit the elevators to the stab with the joiner wire and the hinges. Note that the horn on the joiner wire points downward. Cut a small notch in the TE of the stab for the horn on the joiner wire. If necessary, remove the joiner and tweak it so both elevators are in the same plane.

❏ 19. Once more, test fit the elevators to the stab with the hinges and the joiner wire. Make sure you can obtain the control throws indicated on page 43 of the manual. If you cannot, increase the "V" on the leading edge of the elevators.
Set the stab and elevators aside.

Build the fin and rudder

❏ 1. Tape the **fuse plan** to your building board. Cover the fin and rudder portion of the plan with Plan Protector.

❏ 2. Pin balsa **fin ribs** V1 through V5 to the plan using T-pins as shown in the photograph. Check that the fin ribs are perpendicular to the building board using a triangle or square.

❏ 3. Carefully bevel the front of the ribs to accommodate the sweep of the tapered LE stick.

❏ 4. Cut the balsa **leading edge** from a 5/16" x 15" [7.9 x 381mm] tapered balsa leading edge. Cut it to the length shown on the plan.

❏ 5. Pin the balsa leading edge stick and the die-cut 1/8" **balsa fin TE spar** to the plan in the same manner as the ribs in step 2. Be sure to align the top of the fin LE with the tops of the ribs, allowing the excess to protrude below the ribs (to be trimmed later). Do the same with the fin TE spar. Once you are satisfied with the fit, glue the ribs to the LE and TE.

❏ 6. Glue the die-cut 1/8” balsa **fin TE** to the fin TE spar.

❏ 7. Glue the die-cut 1/8 balsa **fin tip** between the TE spar and the top of V5. Be sure that the tip is centered on the LE and TE as shown in the photograph.

❏ 8. Cut three balsa hinge blocks from the 1/4" x 5/16" x 24" [6.4 x 7.9 x 610mm] balsa stick and glue in place as shown on the plan.

❏ 9. Rearrange any T-pins that protrude above the structure so they will not interfere with your bar sander. Lightly sand the top of the LE and TE to match the airfoil shape of the ribs to accommodate the fin skin.

❏ ❏ 10. Cut a 1/16" x 3" x 30" [1.6mm x 76 x 762mm] balsa sheet into two 8-1/2" [215.5mm] long pieces and one 4-1/2” [114mm] long piece. Edge glue the three sheets together in the same way the stab sheeting was done. This will become one of the fin skins. Use the **Fin Skin Pattern** on the plan to make one fin skin.

❏ 11. Repeat step 10 to make a second fin skin.

❏ 12. Remove the T-pins from the fin assembly and glue one of the fin skins in position. Align the rear of the skin with the TE of the fin and the bottom of the skin with V1.

❏ 13. Remove the fin from the building board. Remove the jig tabs from the other side of the fin and lightly sand the fin ribs, LE and TE to shape.

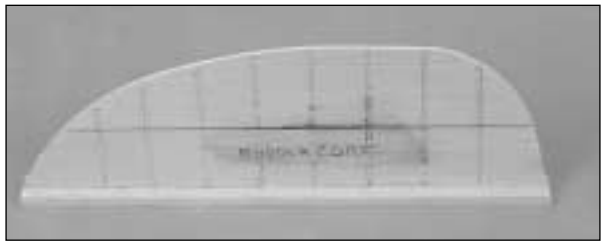
❏ 14. Glue the second fin skin in position on the fin. Take care not to twist the fin when gluing the fin skin in place.

❏ 15. At this point set the fin aside and proceed with the assembly of the rudder.

❏ 16. Glue the die-cut 3/32" [2.4mm] balsa front and rear **rudder core** pieces together to form the rudder core.

❏ 17. Mark the location of the **rudder ribs** on both sides of the die-cut 3/32" [2.4mm] balsa rudder core where shown on the plan. Use the same procedure as in step 1 of building the elevator.

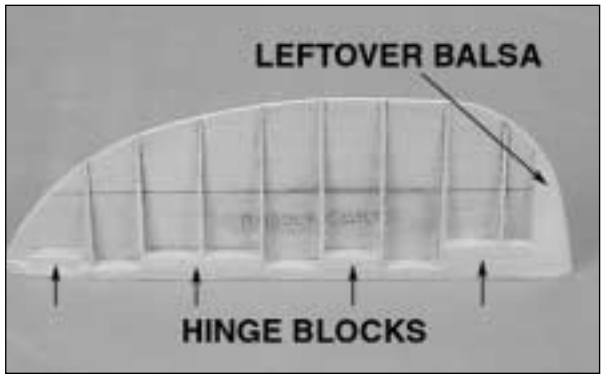
❏ 18. Cut a 1/4" x 1/2" x 24" [6.4 x 12.7 x 610mm] balsa stick to the length shown on the plan to make the **rudder leading edge**.



❏ 19. Draw a centerline on the LE material and glue the rudder core on to the center line.

❏ ❏ 20. Cut four balsa hinge blocks from a 1/4" x 5/16" x 24" [6.4 x 7.9 x 610mm] balsa stick and fit them to the LE of the rudder as shown on the plan. Glue them in place on the left side of the rudder as shown in the photo at Step 22.

❏ ❏ 21. Use a 1/16" x 5/16" x 24" [1.6 x 7.9 x 610mm] balsa stick to make the **rudder ribs**. Cut the sticks to the correct length, then glue them to the rudder cores and the leading edge of the rudder.



❏ ❏ 22. Glue a leftover piece of balsa to the bottom of the rudder to help in shaping the rudder for covering. *The photo above shows one side of the rudder with the ribs, hinge blocks and leftover balsa in place and shaped*.

Repeat steps 20-22 for the right side of the rudder.

❏ 23. Draw a centerline on the LE of the rudder. Mark the location of the hinges. Cut your hinge slots in the same manner you did for the elevator. When this is complete, taper the LE the same way as the leading edge of the elevator.

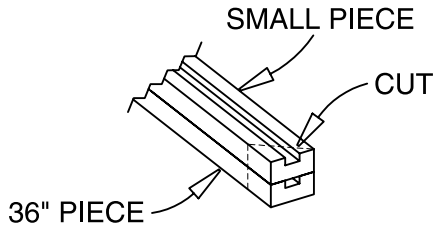
❏ 24. Install the rudder control horn. Rest the small nylon control horn on the rudder as indicated on the plan and mark where to position the die-cut 1/16" [1.6mm] plywood **control horn mount**. Remove the balsa from this area and glue the control horn mount to the rudder. Mount the control horn to the plywood base with two #2 x 3/8” sheet metal screws.

❏ 25. It's time to do the final sanding of the rudder. Verify the shape and taper of the rudder against the fin. When you are satisfied, set it aside and we'll get started on the fuselage.

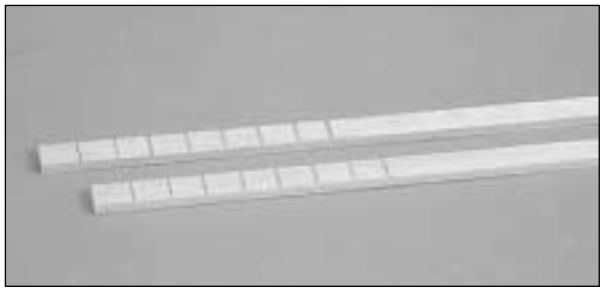
BUILD THE FUSELAGE

Frame the Fuselage top

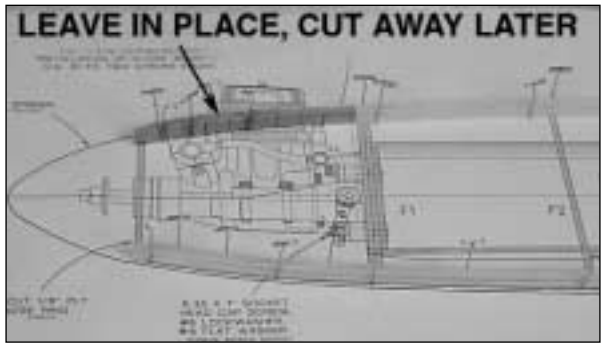
❏ 1. Cut the **fuselage plan** on the dashed lines and tape the fuse top view to your building board. Cover the plan with Plan Protector.



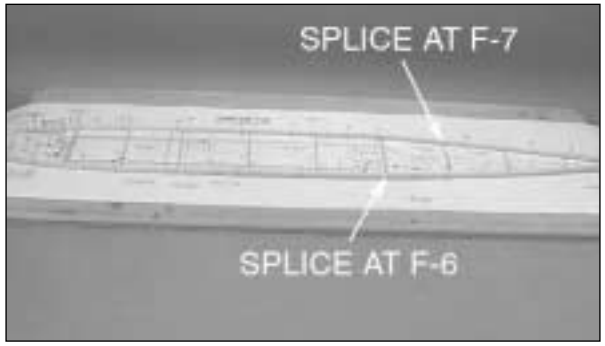
❏ 2. Gather the three 3/16" x 3/8" x 36" [4.8 x 9.5 x 914mm] **grooved main stringers**. Cut one of the stringers into two pieces. One piece will be 20-3/4" [527mm] long; the other piece, 15-1/4" [387.5] long. Place the 20-3/4 " [527mm] long main stringer on top of the 36" [914mm] main stringer so the ends align. Cut the stringers and position them so that the left side main stringer has the splice at former F6. Do the same thing with the 15-1/4" [394mm] main stringer on the right side but with the splice location at F7. The splice locations are noted on the top view of the plan. Cut, splice and glue them together at an approximately 45-degree angle as shown in the sketch (use your miter box if you have one).



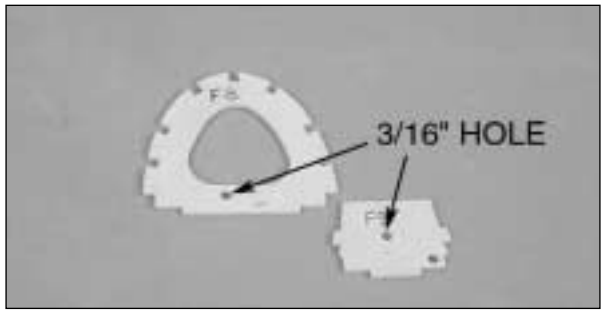
❏ 3. Use a razor saw to cut small v-notches, 3/32" [2.4mm] deep in the inside of the 36" [914mm] stringer. Do this in the area that will be glued between the nose ring and F1. This will allow the stringers to conform to the shape as shown on the plan.



❏ 4. You will notice that the right side main stringer gets cut away forward of F1. **Leave it in place for now**. This will help to secure the nose ring as we begin the process of framing the fuselage.

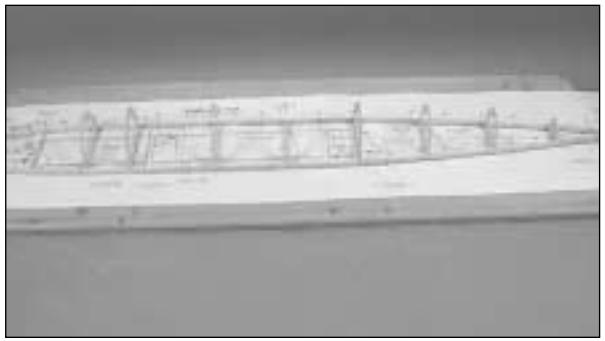


❏ 5. Pin the two stringers to the plan so the left side main stringer is spliced at F6 and the right side main stringer is at F7 as shown on the plan.



❏ 6. Refer to the *Pushrod Locations* area on the fuse plan and drill 3/16" [4.8mm] holes through the punch marks in the die-cut 1/8" [3.2mm] plywood formers F8 and F9. One hole in F8, two in F9.

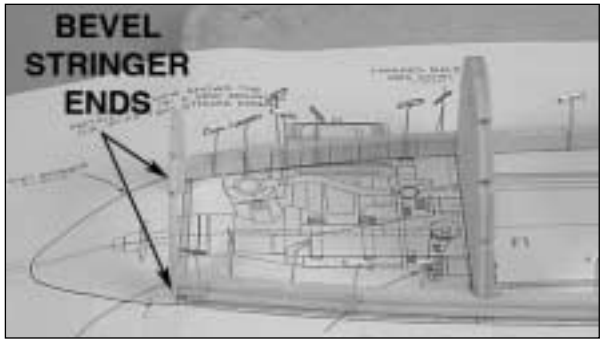
❏ 7. Locate the two **formers F1 and F1A**. Using 6-minute epoxy, glue the two F1 formers together and then the two F1A formers and set them aside to dry. *Do not glue the F1 and F1A formers together at this time.*



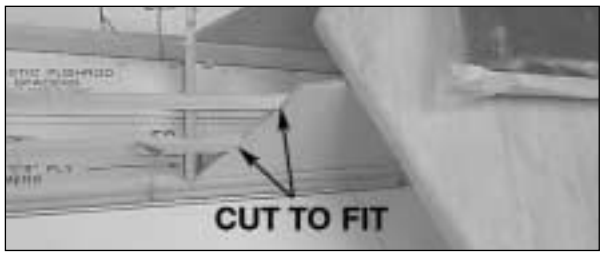
❏ 8. Test fit all die-cut 1/8" [302mm] plywood formers (F2 through F10) to the main stringers over their locations on the plan. You may need to bevel the notches in some of the rear formers to accommodate the angle at which they join the main stringers. Use a small square to make sure the formers are vertical and glue them to the main stringers. Don't be concerned if the formers are slightly warped. You will be able to straighten them when you add the stringers.

❏ 9. Test fit and then glue the **Stab Saddles** into position over the main stringers and to former F9 and F10.

❏ 10. Test fit former F1 onto the main stringers. Use the die-cut 1/8" [3.2mm] ply **firewall gauge** (**FG**) to set the proper amount of down thrust. Permanently glue F1 into position.



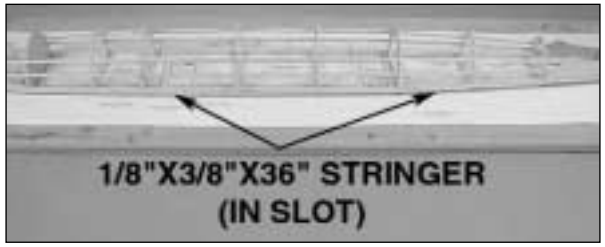
❏ 11. Carefully bevel the front of the main stringers to the angle shown on the plan. Glue one half of the **nose ring**, part **NR,** to the face of the main stringers. Be certain when gluing the nose ring into position that the notches for the stringers are on the left side of the fuselage.



❏ ❏ 12. Temporarily place the stab on the stab saddles and hold it in place with weights. Cut the ends of two 3/16" x 3/16" x 30" [4.8 x 4.8 x 762mm] balsa stringers so they fit the stab saddle as shown in the photo (from now on, all 3/16" x 3/16" x 30" [4.8 x 4.8 x 762mm] stringers will be referred to as just stringers). Cut the other end of the stringers so they end in the middle of former F3. Use a small square to hold the formers vertical as you glue the stringers to them and to the stab saddle.

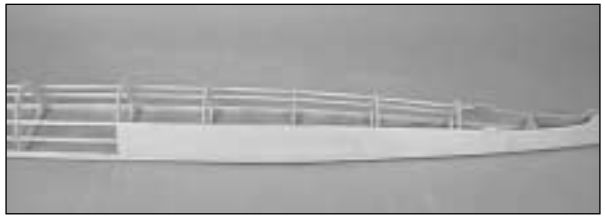
❏ 13. Repeat step 12 for the right side of the fuselage.

❏ 14. Glue stringers from F3 to the front of the nose ring on the left side of the fuselage. Glue stringers from F3 to F1 on the right side. Use the firewall gauge to set the down thrust angle on the nose ring to match the firewall.



❏ 15. Glue one of the 1/8" x 3/16" x 36" [3.2 x 4.8 x 914mm] stringers into the slot in the side of the main stringer. Cut part of another stringer to length to fill the rest of the slot. Repeat this for the other side of the fuselage.

❏ ❏ 16. Test fit one of the 3/32" x 3" x 36" [2.4 x 76 x 914mm] balsa sheets onto the main stringer on the left side of the fuselage. Fit the sheet from the back of the fuselage forward. Minor trimming may be required to get a good fit. When you are satisfied with the fit, tape the sheet in place where the sheeting meets the main stringer.



❏ ❏ 17. Trim the sheeting so that it can be glued to the second stringer. When you are satisfied with the fit, cut the excess sheeting at F4. Glue the sheeting to the two side stringers, the main stringer, the stab saddle and F4.

Hint: Form the sheeting to the stringer and draw a line along the stringer from the back side of the sheet. Now mark a line 3/32" [2.4mm] below that line. This will give you a cut line that will allow the sheeting to be in the center of the stringer.

❏ 18. Repeat step 16 & 17 for the right side of the fuselage.

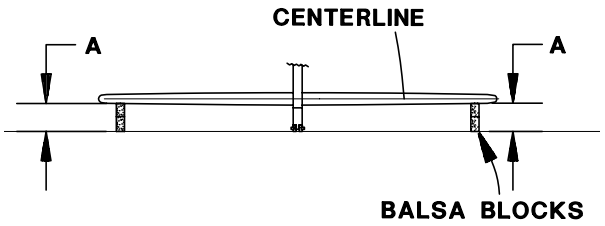
❏ 19. Cut one of the 3/32" x 2 3/4" x 30" [2.4 x 70 x 762mm] balsa sheets to a length of 14" [356mm]. Test fit the 14" [356mm] long balsa sheet onto the main stringer from F4 forward to former F1 on the fuselage right side. Trim the sheeting to fit between the main stringer and the second stringer. When satisfied with the fit, glue the sheeting to the stringers and the formers F1- F4.

❏ 20. Measure the distance from former F4 to F2. Cut the remaining piece of sheeting to that length and glue it in position on the left side of the fuselage.

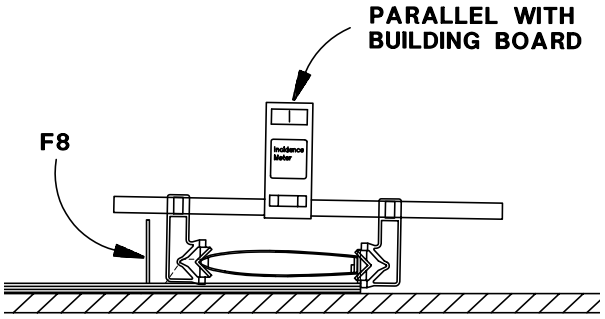
Note: The photo in step 19 shows the proper positioning for the sheeting when you have completed steps 19 and 20. Subsequent photographs show the sheeting already in place to the nose ring. Disregard the fact that the sheeting is there, the instructions will be correct.

Mount the stab and fin

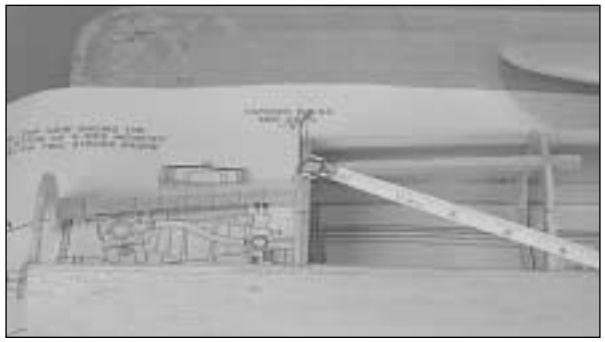
❏ 1. Remove the elevators from the stab.



❏ 2. Place the stab on the stab saddle, aligning the centerline mark on the trailing edge of the stab with the center of the fuselage. Place weights on top of the stab to hold it in position. View the fuse from the rear and make sure the stab is level. To confirm, place balsa blocks (not included) under both sides of the stab and measure the distance from the centerline on the TE of the stab to your building board. If necessary, reposition the balsa blocks, shift the weight or carefully sand the high stab saddle until the stab will rest level. Be sure to sand carefully and a little at a time so as not to change the incidence angle of the stab.



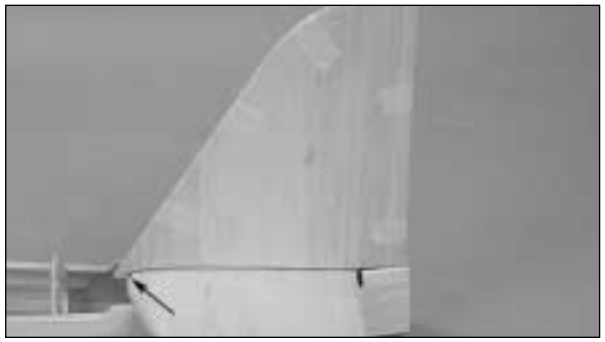
❏ 3. With the stab resting on the saddles and weights on top to hold it down, check the stab incidence by placing an Incidence Meter across one side of the stab, then the other side of the stab near the fuse. If necessary, adjust the stab saddles so the incidence is parallel with your building board.



❏ 4. Place a leftover piece of 3/16" x 3/16" [4.8 x 4.8mm] stringer in the top center notch of formers F3 and F4. Insert a T-pin in the center of the stringer at F3. Place a **Hobbico Retractable Fabric Tape Measure (HCAR0478)** (or any suitable measuring device) over the T-pin and measure the distance from the pin to the left tip of the horizontal stab and then to the right tip of the stab. Adjust the stab until the distance from the pin is the same on both sides of the stab

❏ 5. Recheck to see that your stab is still level. Mark the exact location where you will glue the stab to the saddle.

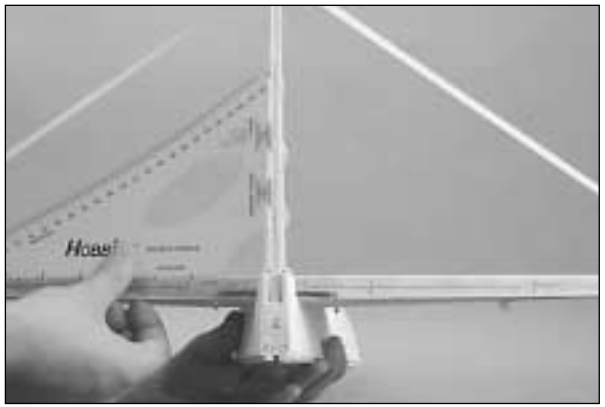
❏ 6. Now that you are sure the stab will align, remove it and apply 30-minute epoxy to the joining areas and glue it to the fuse sheeting and the ply stab saddle. Use the tape measure technique to recheck your alignment. Make sure the stab is level and the incidence is correct. Wipe away excess epoxy before it cures. Do not disturb the fuse until the epoxy is fully cured.



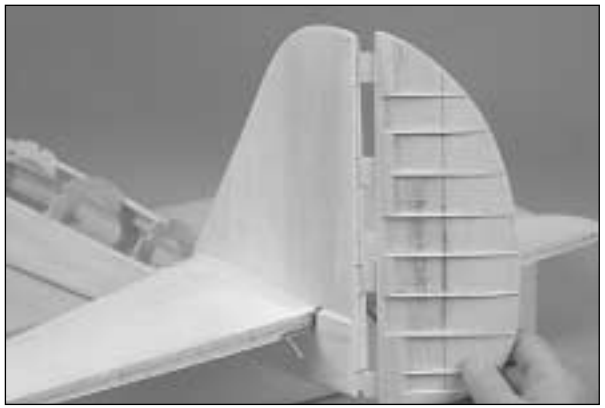
❏ 7. Test fit the fin on the fuselage at former F10. Sand a little of the stab where the leading edge comes together. This is necessary to give proper clearance for the leading edge of the fin to attach to the front of the stab. Sand the fin sheeting as needed to achieve a good fit with the stab.

❏ 8. Remove the vertical fin and place the elevator joiner wire into position into the slot in the stab saddle.

❏ 9. After you are satisfied with the fit of the fin to the stab, apply a film of 30-minute epoxy to the base of fin rib V1 and to the stab sheeting. Pin V1 of the fin assembly so that you get a good glue joint between V1 and the stab. Align the LE of the fin with the centerline on the plan. Immediately proceed to the next step.



❏ 10. Hold the fin vertical with masking tape strapped across the top of the fin over to both stab tips. Adjust the tension on the masking tape to pull the fin to one side or the other until it is vertical. Re-check alignment and do not disturb the fin until the epoxy is fully cured.



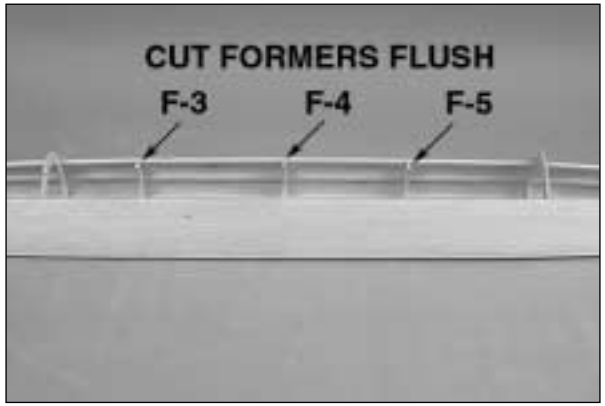
❏ 11. Draw a centerline on the balsa TE. Place the rudder into position on the rudder TE and mark the location of the hinges. Cut the hinge slots into the fin and the rudder LE.

❏ 12. Now's a good time to sand all of the components of the tail structure.

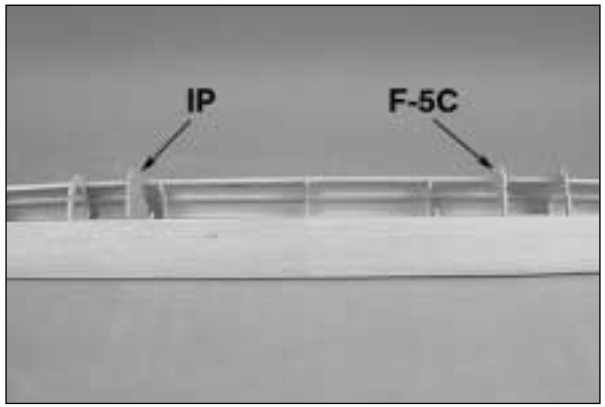
Let's get the top of the fuselage sheeted and get it off the building board!

Sheet the top of the fuselage

Before proceeding with sheeting the top of the fuselage, you need to decide how you are going to finish the cockpit area. You have the option of creating a full cockpit or simply gluing a pilot bust under the canopy. There is no question the addition of the full cockpit interior is going to really add to your model. We would suggest that you take the additional time to do this.



❏ 1. Cut formers F3, F4 and F5 flush with the top of the sheeted stringers. This will create our cockpit area.



❏ 2. Locate and glue the die-cut 1/8" [3.2mm] ply former F5C and former IP into position as shown on the plan.

❏ 3. Test fit the stringers into position in the notches on former F5C back to the tail. At the tail, sand the stringers to fit where they meet with the fin and stab. When you're satisfied with the fit, glue the stringers in place.

❏ 4. Test fit the stringers into position in the notches on former **IP** forward to the nose ring and firewall. The stringers go to the nose ring on the left and center stringer. The right side stringer should stop at the front of F1. Glue them in place when you are satisfied with the fit.

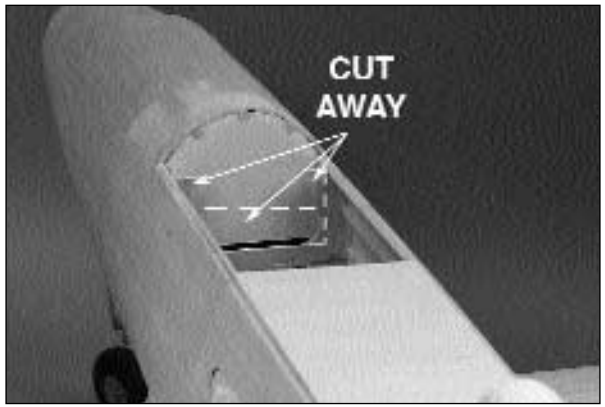
Have you decided on your cockpit option yet? No more procrastination!

CONSTRUCTION **WITHOUT** A FULL COCKPIT INTERIOR

If you are choosing not to have a full cockpit interior, make a **deck** out of the **1/16" x 3" x 24" [1.6 x 76 x 610mm] balsa sheeting**. This should be placed between formers IP and F5C and trimmed flush with the side stringers.

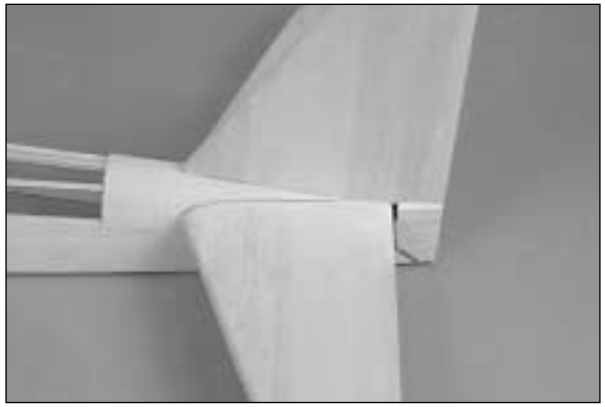
CONSTRUCTION **WITH** A FULL COCKPIT INTERIOR

If you are choosing to have a full cockpit interior, make a **deck** out of the **1/16" x 3" x 24" [1.6 x 76 x 610mm] balsa sheeting**. This should be placed between formers F4 and F5C and trimmed flush with the side stringers.



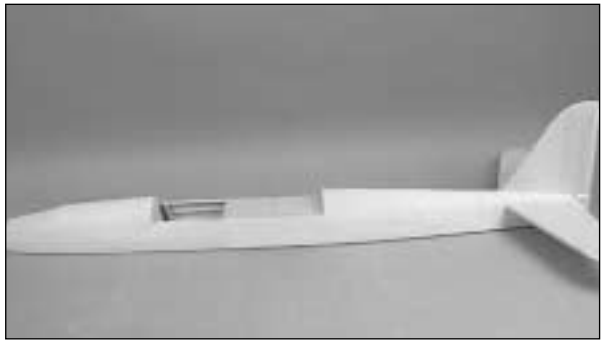
❑ 5. Cut away **former F3** and **IP** as shown in the photograph.

❑ 6. Cut the **tail fillet pattern** from the plan and make two of them from some of the leftover pieces of 3/32 [2.4mm] balsa sheeting.



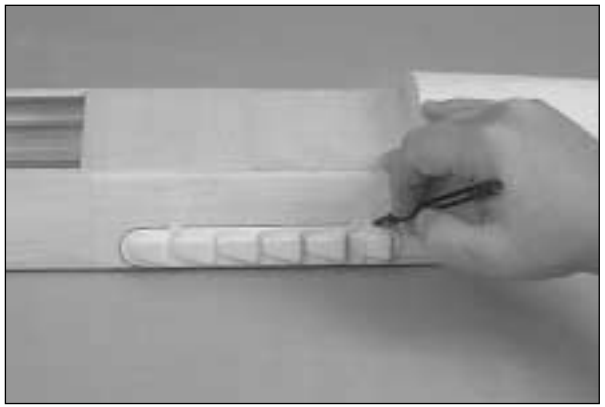
❑ 7. The fillet pattern is slightly oversized, so you will have to do some final fitting to get a good fit. The fillet should fit around the tail surfaces and forward to the center of F8. When you are satisfied with the fit, wet the fillet pieces with a solution of water and alcohol. This will allow the balsa to become flexible without cracking. When the balsa has become flexible enough, glue the fillet into position.

❑ 8. After the fillet has been glued into place use some **Lightweight Hobby Filler (Balsa Color, HCAR3401)** to fill any gaps and create a smooth fillet.

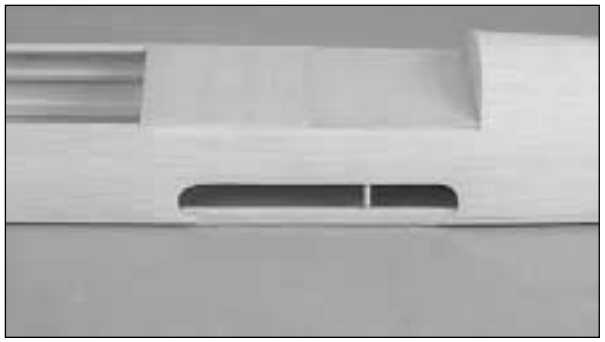


❑ 9. Cut one of the sheets of 3/32" x 2-3/4" x 30" [2.4 x 70 x 762mm] balsa sheeting to form the front and rear decking. Before test fitting it into place, wet the wood with the water and alcohol solution so that the wood becomes flexible enough to conform to the shape of the formers. We recommend cutting a piece for the left side of the fuselage and one for the right, joining the two sheets on the center stringer. The radius of the formers is too tight to complete the sheeting with one sheet of balsa. When you have completed one side of the fuselage do the same for the other side.

NOTE: *The photo above, incorrectly shows sheeting on the left side of the fuselage in the nose area. Do not sheet the area from F-2 forward to the nose ring on the left side of the fuselage.*



❏ 10. Cut out the **ABS plastic exhaust stacks**. After trimming, mark "left"on one and "right" on the other, on the back of each piece so you are sure to get a good fit when doing the final assembly. Tape one in place on the side of the fuselage as shown on the plan. Trace around the part with a pen to indicate where you will be cutting balsa wood away.



❏ 11. Cut out the area you just marked. Do this carefully so the exhaust stack will have a good fit into this cavity. Set the stack aside for now. It will be glued in place after the final covering.

❏ 12. Do the same for the other side of the fuselage.

That's it for the top half of the fuselage. You're halfway there! Let's proceed with the bottom half.

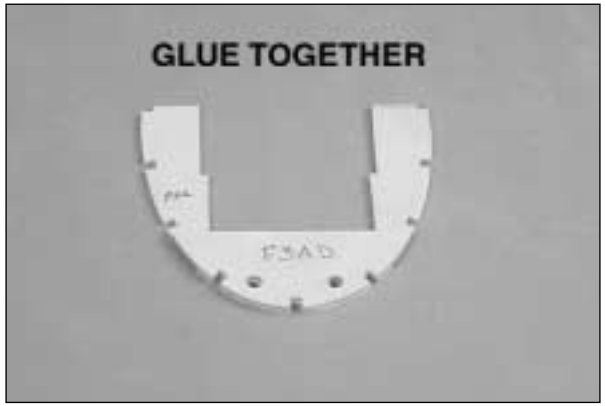
Build The Bottom Of The Fuselage

❏ 1. Place the fuselage upside down in a stand. We prefer the Robart Super Stand. You can see it in many of the following photos.

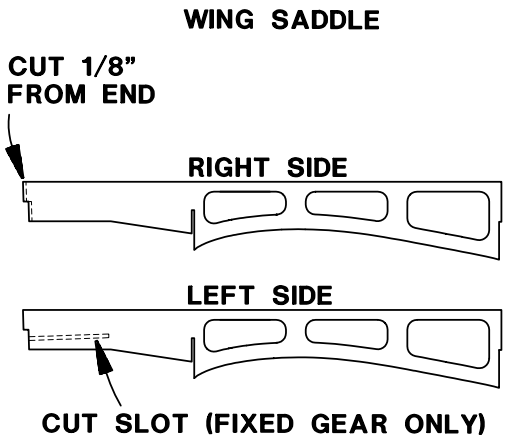
❏ 2. Locate the die-cut 1/8" [3.2mm] plywood fuselage formers **F1A through F10A** for the bottom of the fuselage.

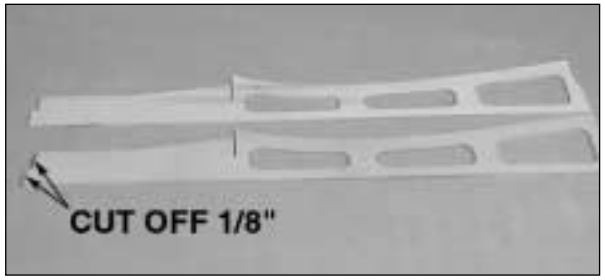
P-39 Fact

At the time this manual was published there was only one flyable P-39 in the world!

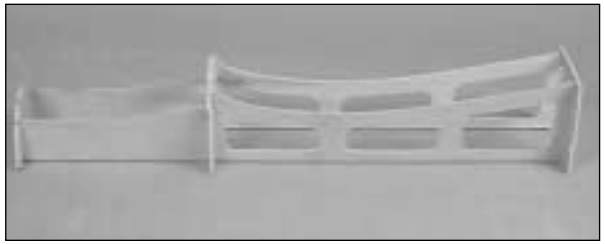


❏ 3. Glue **former F3AD to F3A**. From now on the F3A/F3AD assembly will be referred to as F3A.





❏ 4. Locate the two **wing saddles**. Cut 1/8" [3.2mm] off of the front end of one of the saddles. This will be the **right** wing saddle. This is very important! By assembling the saddle correctly you will have the proper amount of right thrust needed for the plane to fly well.

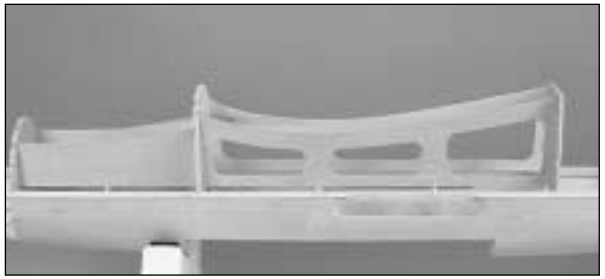


❏ 5. If you will be installing fixed landing gear, drill 3/16" [4.8mm] holes in formers F2A through F5A for the nose gear steering pushrod. These holes are on the left side of the former. Refer to the plan for the location of the holes. Cut the slot on the left wing saddle as shown in the sketch above. There are embossed cut lines on the saddle.

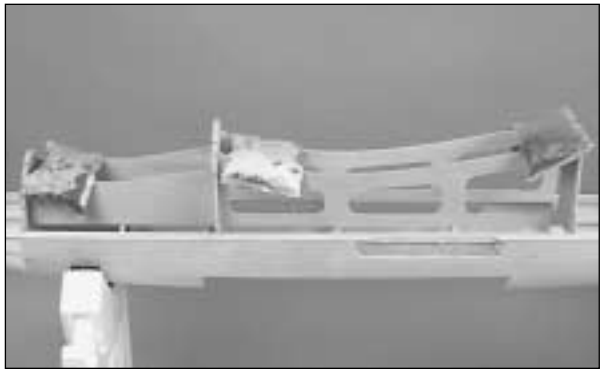
❏ 6. Test fit formers F1A, F3A and F6A to the wing saddle. The formers and saddle have been notched to allow the structure to interlock together. When you assemble this structure, the longer wing saddle should be on the left side of the assembly. *Remember, you are building this upside down. Make sure that you have the longer wing saddle on what will be the left side of the fuselage.*

❏ 7. Both formers must be square to the saddles. When you are satisfied with the fit, glue F3A and F6A to the saddles with CA.

❏ 8. Glue F1A to the saddle using 30-minute epoxy. Set the saddle assembly aside to dry.



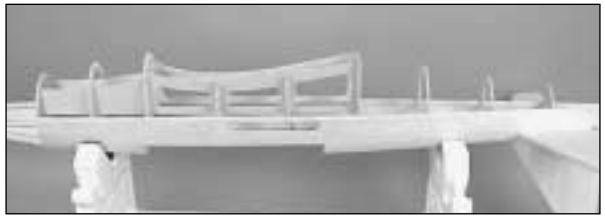
❏ 9. When the epoxy in the saddle assembly has cured, test fit the saddle assembly to the fuselage.



❏ 10. When you are satisfied with the fit, glue it permanently in place onto the fuselage. This should be done with 5-minute epoxy and some weights to hold it in place. Allow the epoxy to cure.

❏ 11. Locate the 1/8" x 2-3/4" x 2-3/4"[3.2 x 70 x 70mm] firewall backplate. Glue it to the back of F1 and F1A with 5-minute epoxy. Locate it as shown on the plan.

❏ 12. Glue two F4A formers and two F5A formers to each side of the wing saddle as shown on the plan. Glue former F2A in place as shown on the plan.



❏ 13. Glue formers F7A, F8A, F9A and F10A into position as shown on the plan. Be sure that they are straight when you glue them in place. **Do not** glue F6AD in position yet.

❏ 14. Temporarily place two balsa side stringers in position as shown in the photograph. This will give you the position for gluing F6AD in place. When satisfied with the fit, glue F6AD to F6A, and remove the stringers.

Install the Pushrods

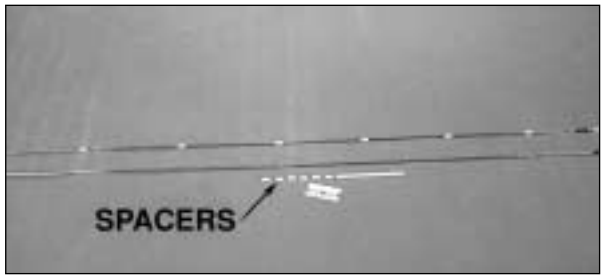
❏ 15. Before we close the rest of the fuselage, this would be a good time to position the pushrods and servo mounting rails. Locate a **1/4" x 3/8" x 36" [6.4 x 9.5 x 914mm] basswood stick** and cut four pieces as shown on the plan to fit the fuselage. These become the servo mounting rails.

❏ 16. Glue the servo mounting rails into position as shown on the plan (See photo at Step 21.)

❏ 17. Cut a **plastic pushrod outer tube** to length for the elevator and put it in place. This tube should go through the hole that you previously drilled in F9. Roughen the tube with sandpaper in the areas where the tubes will be glued.

❏ 18.Mark the rudder pushrod exit on the left side of the fuse where shown on the fuselage plan. Drill a 3/16" [4.8mm] hole on the mark. Angle the drill approximately 25 degrees when drilling on the mark. This will allow the pushrod to exit the fuse at the correct angle

❏ 19. Cut the plastic pushrod outer tube to length for the rudder. Roughen the tube with 150 grit sandpaper where it will be glued to the wood. Glue the tube in position through the hole you just drilled in the side of the fuselage.

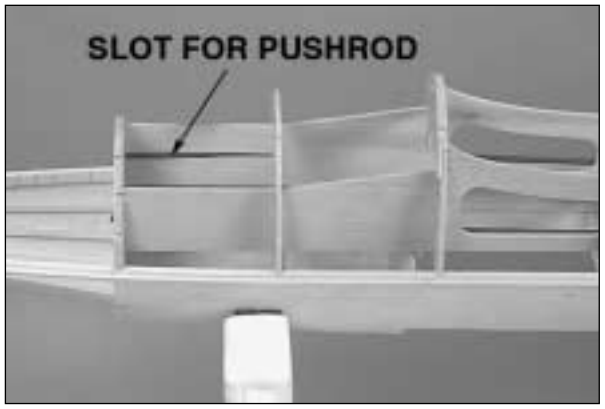


❏ 20. Cut the .074 wire pushrods to length for each of the control surfaces. Clean residual oil from the pushrod wire with a cloth dampened with alcohol or other solvent. Cut six 3/8” spacers from the white inner pushrod tube, then slide them, evenly spaced, onto the wire. Make sure you position the bushings at the ends of the wire so they will not protrude from the guide tube, or the controls could become jammed during flight. If the spacers slide easily onto the wire, secure them with a drop of thin CA (make sure the CA sets before you slide the pushrod into the guide tube!). If the spacers are difficult to slide on, cut them to a shorter length so they will be a little easier to slide onto the wire.

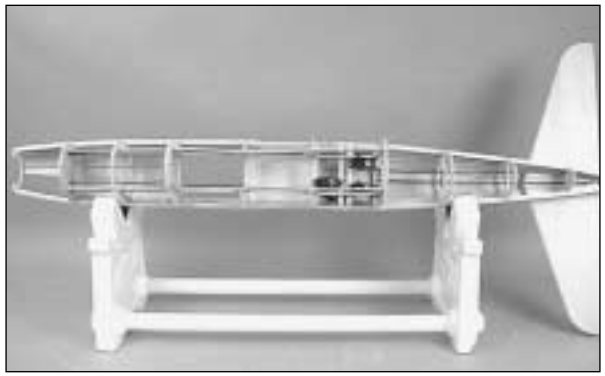
❏ 21. Locate five die-cut 1/8" [3.2mm] **ply guide tube holders**. Drill a 3/16" [4.8mm] hole through the punch mark on the holders.

❏ 22. Support the plastic outer pushrod tube with the five die-cut 1/8" [3.2mm] ply guide tube holders by gluing them in place at F6 - F8.

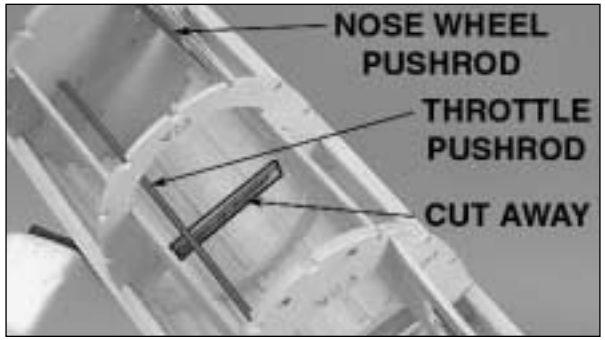
This next step only applies if you are going to have a fixed gear. Skip step 23 if you are installing retracts.



❏ 23. Install the plastic pushrod outer tube for the nose wheel steering by cutting the tube to length and then inserting it through the holes that you drilled in the die-cut fuselage formers F2A through F5A on the left side of the fuselage. The tube should pass through the slot in the wing saddle and reach to the front of the firewall. Use a 3/16" [4.8mm] drill to make a hole in the firewall at the position the pushrod will exit the firewall.



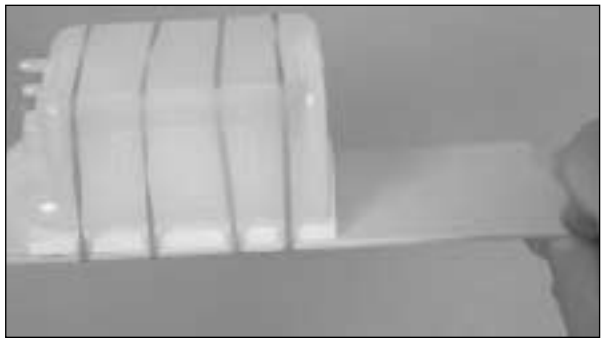
❏ 24. Mount the elevator, rudder and throttle servos into position as shown on the plan. Once they are in place and you are satisfied with the position of the servos and the plastic outer pushrod tubes, glue the tubes in place with a few drops of CA.



❏ 25. This is a good time to get the fuel tank installation finished. Cut the cross-brace on F2 out of the fuselage. This is necessary to give clearance for the fuel tank.

❏ 26. It's time for you to make another decision. The P-39 (as in other models you may have built) has a very tight compartment for the fuel tank. The easy way would be to make the fuel tank a permanent installation. Though it is easier, this has some potential long-term problems. If you wish to mount it permanently, go ahead and do that now.

We recommend that you take a little time and use the following instructions to mount the tank so it can be removable. It will be a little tedious and may require you to do a little shaping, but the end result will be fairly easy tank removal if needed.



❏ 27. Locate the die-cut 1/8" **fuel tank floor**. Put a piece of 1/4" [6.4mm] foam between the floor and the fuel tank. Attach the tank to the floor with #32 rubber bands (included in the kit). Trial fit the fuel tank into the fuselage. The floor should extend all the way to the firewall and 1/4" [6.4mm] beyond former F3. The notches in the leading edge of the floor are there to allow some clearance for the blind nuts that will be added to the firewall later. The tab in the center of the floor is going to be the point at which the floor will attach to the firewall. Remove the assembly from the fuselage.

❏ 28. Cut a piece of 1/4" x 3/8" [6.4 x 9.5mm] basswood to fit between the wing saddles and locate it approximately 1/4" [6.4mm] behind F3. Glue it in place so that the basswood strip is flush with the top of the wing saddle structure.

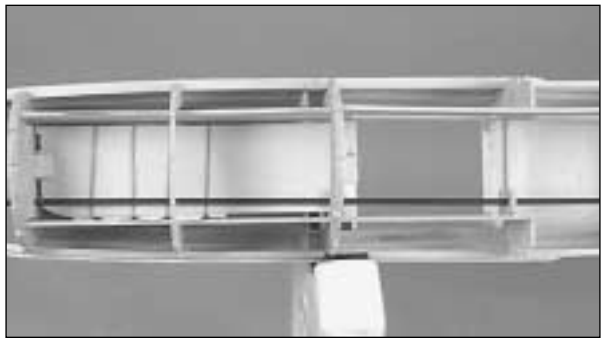
❏ 29. Trial fit the floor assembly with the fuel tank into the fuselage. Be sure that the aft end of the floor is resting against the basswood block you glued in. Mark a line on the firewall where the floor rests. Remove the tank and floor.

❏ 30. From leftover 1/4" x 1/2" [6.4 x 12.7mm] balsa, cut two pieces 5/8" [15.9mm] in length and glue them to the firewall. One will be 1/16" [1.6mm] above the mark on the firewall. The other will be 1/16" [1.6mm] below the mark. These two blocks form the channel that your floor will slide into when put into place.

❏ 31. Test fit the fuel tank assembly into the fuselage and make sure the floor slides in between the two blocks you glued to the firewall. Drill a pilot hole in the floor where the floor meets the basswood block and then screw the floor to the basswood block with a #2 x 3/8" [9.5mm] screw.

❏ 32. With the fuel tank floor still in place, cut a plastic outer pushrod tube to length for the throttle servo.

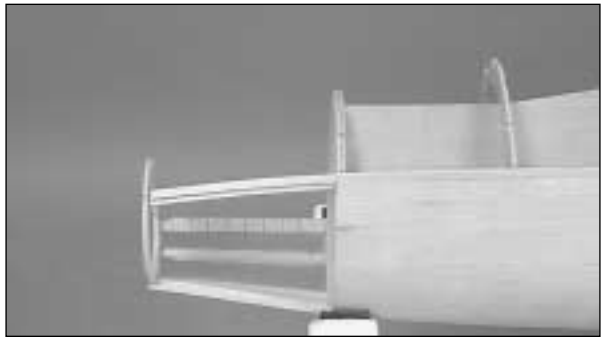
❏ 33. Hold your engine against the firewall to locate where the throttle pushrod will need to come through the firewall. Drill a 3/16" hole in that location. Slide two of the ply guide tube holders over the plastic pushrod, and then put the pushrod in place so that it is just extending through the firewall. The ply guide tube holders should be positioned at F3 and F4. A notch is in the fuel tank floor to allow placement of the guide tube holder at F3. Double check the positioning to be sure everything lines up properly.



❏ 34. Glue the pushrod in place at the firewall.

❏ 35. When you installed the pushrods in the rear of the fuselage you glued the guide tube holder to the formers. For the tank installation use #2 x 3/8" [9.5mm] screws to attach the guide tube holders to formers F3 and F4. This will allow you to move the throttle pushrod out of the way when the need to remove the tank arises.

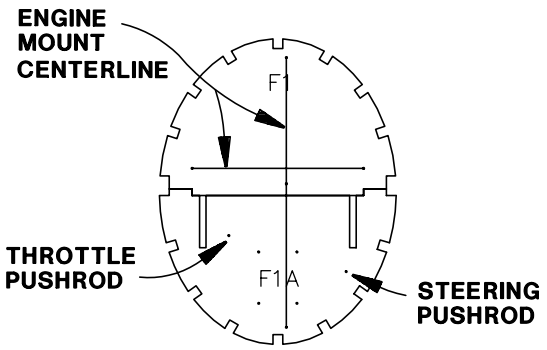
❏ 36. Glue the outer pushrod tube to the guide tube holder at F4. *Do not glue the outer pushrod to the guide tube holder at F3.*
Note: When you want to remove your fuel tank you will need to slide the guide tube holder at F3 back to F4. If it has been glued in place it will be difficult to remove the tank assembly.



❏ 37. Carefully cut away the right side main stringer that has been holding the nose ring in place.

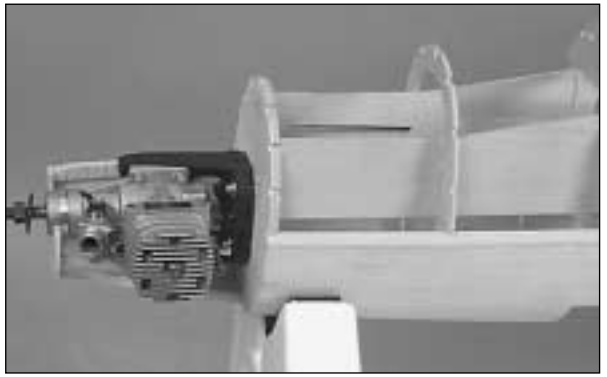
❏ 38. Locate and drill 15/64" [6mm] holes through the firewall to accommodate the fuel line and pressure line.

Install the Engine



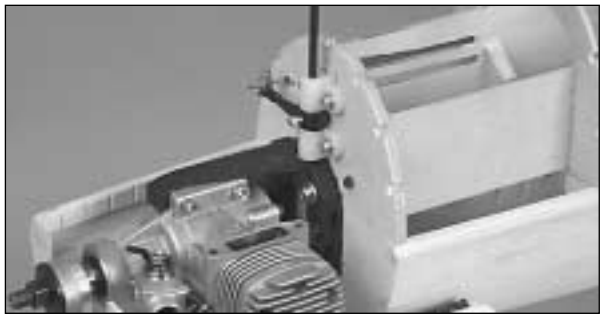
❏ 39. On firewall former F1 there are four pin punch marks. Connect the pin punch marks with a pencil as shown on the sketch. Continue the centerline onto former F1A.

❏ 40.Use CA to tack-glue the engine mount to the firewall. Use the lines just drawn on the firewall as a reference for locating the engine mount in the center of the firewall.



❏ 41. Once you are satisfied with your engine mount position, drill four 3/16" [4.8mm] holes for the engine mount. (A long drill bit may prove helpful if you have one, but is not necessary. We drilled ours using a standard bit). After you have drilled the holes, install four 6-32 blind nuts and fit the engine mount to the firewall.

Step 41 - 43 apply only for the fixed gear installation. Skip to step R1 if you are installing retracts.



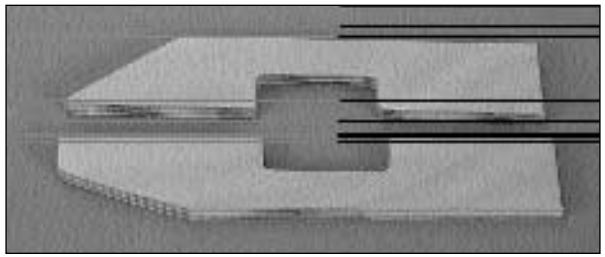
❏ 42. Drill 1/8" [3.2mm] holes in F1A at the four punch marks for the nose gear bearing mount. Mount the nose gear bearing to the firewall with 4-40 bolts, washers and blind nuts.

❏ 43. Enlarge the 5/32" hole in the nose gear bearing with a 3/16" drill bit. Install the steering arm assembly into the nose gear bearing. Put the nose gear wire in position.

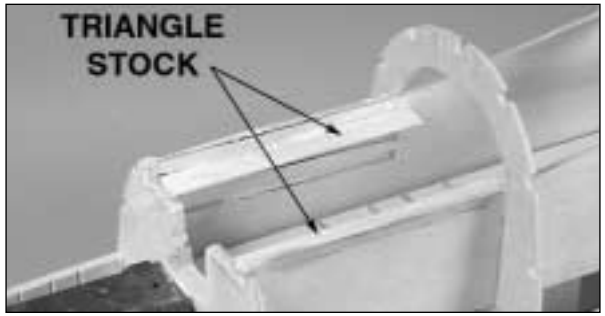
❏ 44. Cut the nose gear pushrod to length and install it using a Z-bend at the steering arm and a screw-lock pushrod connector at the servo.

Retract Installation (nose gear)

❏ R1. Using the pattern on the plan as a guide, cut out the center portion of the firewall to give clearance for the Robart nose gear unit and the mounting rails.

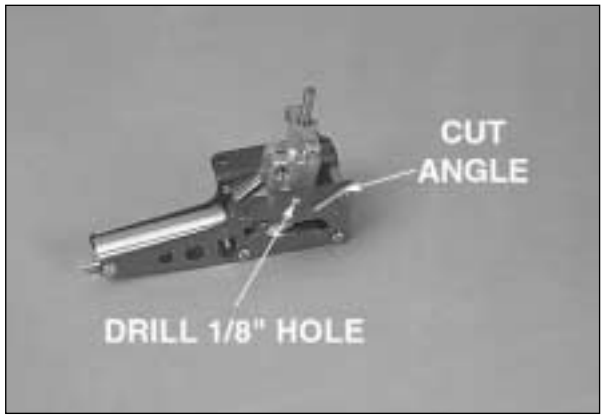


❏ R2. Locate the 1/4" x 1" x 12" [6.4 x 25.4 x 305mm] plywood nose gear rail. Cut two rails to match the pattern on the plan. Sand them to match the photograph above. Be sure you sand enough wood away to give clearance for the fuselage as it tapers forward to the nose ring.

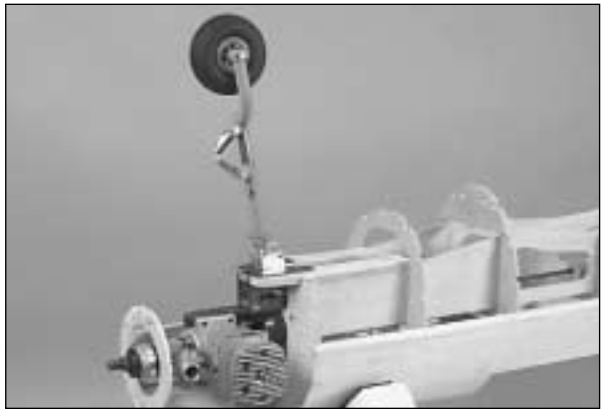


❏ R3. Cut the **3/8"x 30" [9.5 x 762mm] balsa triangle stock** into two pieces approximately 4-1/8" [105.2mm] in length. Glue the triangle pieces to the inside edges of the wing saddle with 30-minute epoxy.

❏ R4. Glue the two plywood nose gear rails to the bottom of the firewall, wing saddle and triangle stock with 30-minute epoxy. Clamp them in position and set the assembly aside to dry.

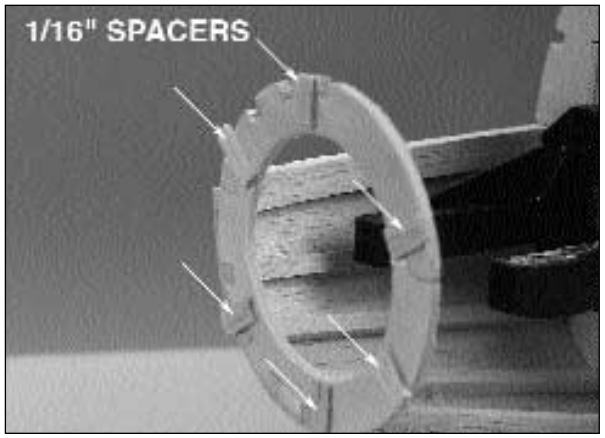


❏ R5. The left side of the landing gear plate requires a slight modification to accommodate the narrow fuselage. Using a Dremel cut-off wheel or a bench grinder, remove the corner of the plate on the left side of the landing gear plate as shown in the photo. Drill a 1/8" hole in the position shown in the photo.

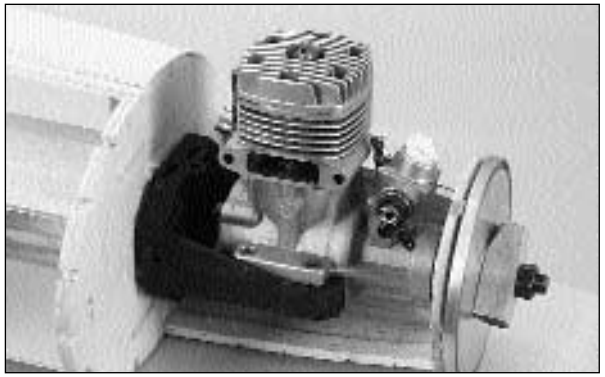


❏ R6. Bolt the nose gear retract into position on the rails with #4 flat washers and 3/8" [9.5mm] sheet metal screws included in the kit. The nose wheel steering control will use a pull-pull system which will be installed when we get to finishing the lower half of the fuselage.

We will discuss the installation of the main gear retracts when we get to that point in the wing construction.



❏ 45. Glue the other half of the nose ring (NR) in position on the front of the fuselage. Temporarily glue a few 1/16" [1.6mm] spacers to the nose ring to act as spacers for the spinner.



❏ 46. Position the engine in place on the engine mount. With the spinner backplate centered on the nose ring, tack glue the spinner backplate to the 1/16" [1.6mm] spacers. Lock the spinner backplate in place with the prop nut. This now shows the exact position for mounting the engine.

❏ 47. Mark the location of the mounting holes on the mount. Remove the engine but leave the spinner backplate glued to the nose ring spacers. Drill a #29 hole (a 1/8" [3.2mm] bit will be close if you don't have a set of number bits) and tap the mount with a 8-32 tap. **Hint**: The Great Planes Dead Center™ Tool works great for this!

❏ 48. Install the engine onto the engine mount and put the prop nut back on the engine to hold the spinner backplate tight to the nose ring spacers.

❏ 49. Locate the piece of 3/32" x 2 3/4" [2.4 x 70mm] balsa sheet that was left over from sheeting the fuselage on page 16, step 20. Glue it in position from F2 to the nose ring.

❏ 50. Leave the engine and spinner backplate mounted in place throughout the entire sheeting of the fuselage. This will assure you that the nose ring and spinner backplate will be properly aligned when the sheeting is glued in place. Some of the photographs shown in the manual do not show the engine and spinner backplate mounted. We removed them for clarity in the instructions, but be sure to leave the engine and spinner in place as you continue building.
***Hint**: When you complete the entire fuselage construction and sheeting, wet the fuselage sheeting from F2 forward to the nose ring and let it dry overnight. After the wood has dried you can break the spinner backplate away from the nose ring and the temporary shims.*

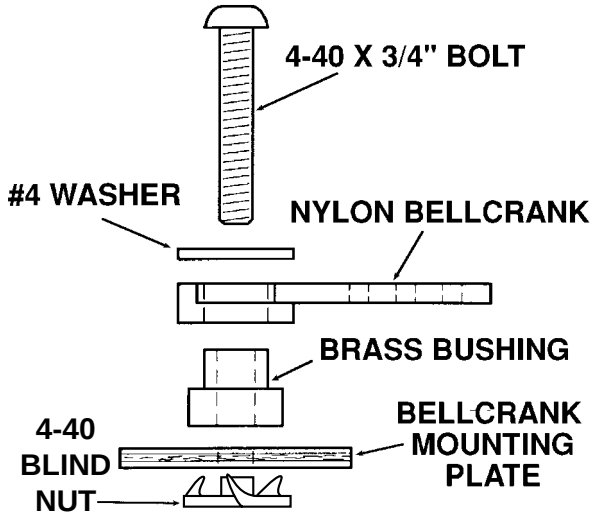
❏ 51. At this point you must install the pushrod for the elevator. After we get the fuselage closed you will no longer have access to the clevis. Make sure when installing the clevis that you have a piece of tubing over it to keep it locked in position. You may also install the rudder and throttle connections at this time.

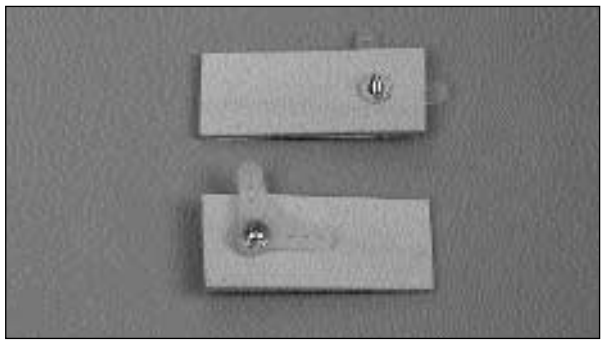
Set the fuselage aside and get started on the wing. Don't be concerned that we still have some work remaining on the fuselage, it will be helpful to leave it open until the wing is all mounted.

BUILD THE WING

NOTE: The wing panels are built "UPSIDE-DOWN" on the plan. Since it is the standard procedure to show the Top View of the wing and the wing panels are built upside-down, the LEFT wing panel is built over the RIGHT Wing Top View and vice-versa. This does not present any problems - just be sure to build a left and a right wing.

❏ 1. Locate the four 1/4" x 3/8" x 36" [6.4 x 9.5 x 914mm] basswood **Wing Spars**, then cut them so they are 1/2" [12.7mm] longer than shown on the plan. Save the cut-off ends for the flap servo hatch mounts.

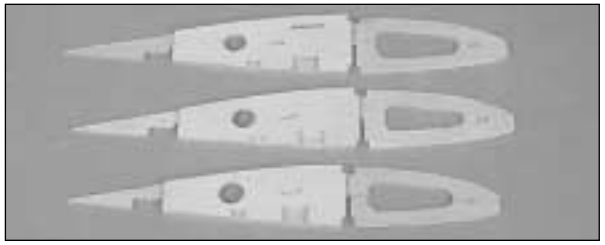




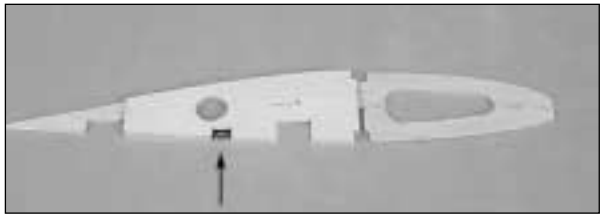
❏ 2. *Perform this step only if you are going to be installing flaps*. Drill 1/8" [3.2mm] holes through the

punch marks in the two die-cut 1/8" [3.2mm] plywood **Flap Bellcrank Plates**. Assemble the bellcrank parts as shown in the sketch (don't worry, there is *no right* and *left* - you can't build them backwards). Put a drop of 6-minute epoxy on the **4-40 blind nut and threads** to prevent the bellcrank from vibrating loose.

❏ 3. Punch out all of the die-cut 3/32" [2.4mm] balsa **Wing Ribs** and the die-cut 1/8" ply **Rib Doublers**. Smooth out any imperfections with sandpaper.



❏ 4. Locate wing ribs **W-4, W-5, W-6** and plywood doublers **W4-R, W5-R, W6-R**. Use 6-minute epoxy to glue the ribs and doublers together. Be sure to make a **LEFT** and a **RIGHT** of each rib assembly.

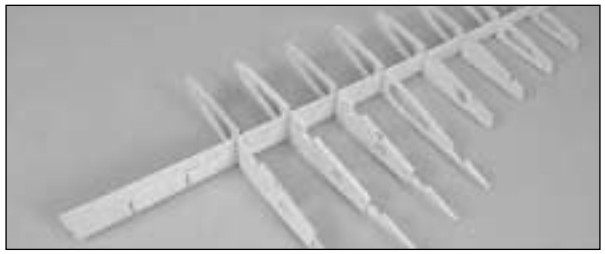


❏ 5. If you are going to be installing the retractable landing gear, cut away the shaded area as shown in the photograph. Do this for ribs W4, W5, and W6.

Build The Wing Panels

Reminder, as you are building the wings you are building them upside-down.

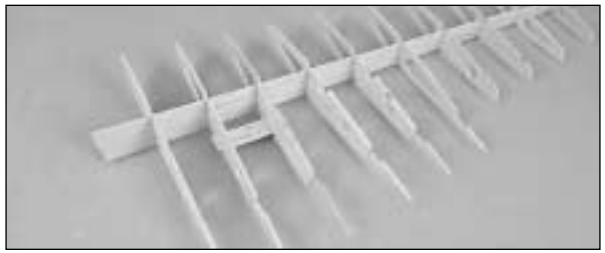
❏ ❏ 1. Locate two of the basswood wing spars you cut earlier, the die-cut 1/8" [3.2mm] **balsa spar web** and one set of wing ribs.



❏ ❏ 2. Test fit wing ribs W4 - W11 onto the die-cut 1/8" [3.2mm] balsa spar web. DO NOT glue together yet.

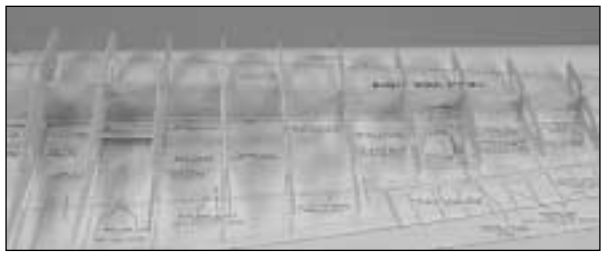
Perform steps 3 and 4 only if you intend to install flaps. (*If you have never had flaps, this would be an excellent plane to use them on. When flaps are deployed there is very little ballooning and the plane slows very nicely without tip stalling. We would recommend you take the extra effort and put them on).*

❏ ❏ 3. Slide the flap bellcrank mount into the slot in W4. Be sure that the bellcrank is oriented as shown on the plan and that it faces the top of the wing.

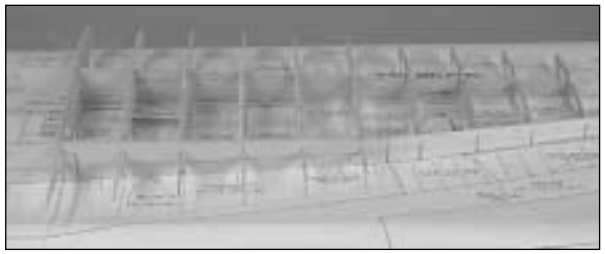


❏ ❏ 4. Put W3 in place on the balsa spar web and slide the bellcrank mount into the slot in W3 as shown.

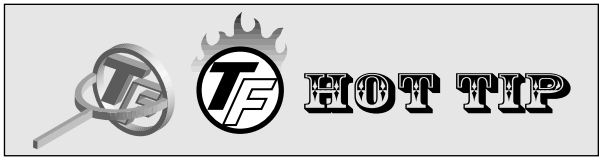
❏ ❏ 5. Put W2 in place on the balsa spar web.



❏ ❏ 6. Pin one of the 1/4" x 3/8" [6.4 x 9.5mm] basswood wing spars on the plan, and then place the rib and spar web assembly onto the spar.



❏ ❏ 7. Test fit the die-cut 1/8" [3.2mm] **balsa inner TE spar** and the die-cut 1/8" [3.2mm] **balsa outer TE spar** onto the end of the ribs. Sand the spars where they meet and make sure you get a good joint. Make sure that when the ribs are positioned in the spar slots they are contacting the top of the slot. Take a close look down the trailing edge of the ribs and be sure they are in line with one another.



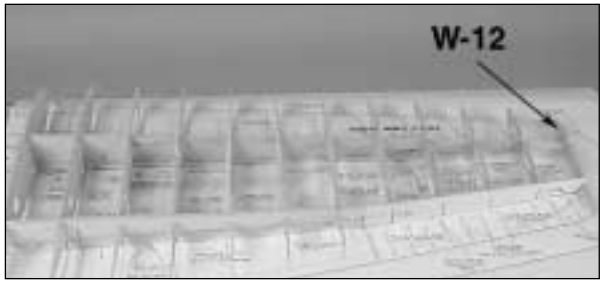
Saturate the flap ribs with some thin CA. This will prevent them from breaking off when you are handling the wing during the building process.

❏ ❏ 8. Pin the inner and outer trailing edge spars to the flat work surface.

❏ ❏ 9. Once you are satisfied that everything fits well, glue the balsa spar web to the ribs and the basswood spar with CA glue. It is important that the glue joint between the basswood spar and the balsa spar web is solid. Be sure you glue the ribs to both TE spars.

❏ ❏ 10. Glue the remaining basswood spar in place in the bottom rib slots.

❑ ❑ 11. Position W1 onto the spars. Locate the die-cut 1/8" dihedral gauge (**DG**). Use the gauge to set the angle of W1 when it is fit into the spars. When you are satisfied that everything fits well, glue W1 in place.

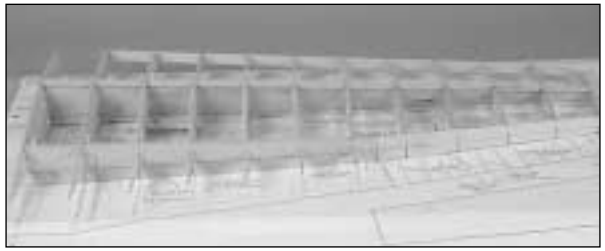


❑ ❑ 12. Glue W12 in position on the end of the wing spars.

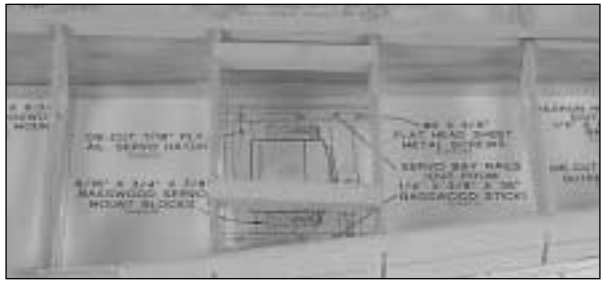
❑ ❑ 13. Now that all of the ribs have been glued in place, glue the bellcrank mounting plate in position with CA.

❑ ❑ 14. Bevel the front of the ribs at a slight angle to achieve a good fit between the ribs and the tapered leading edge.

❑ ❑ 15. Locate the **tapered balsa leading edge** and position it over the plan. At the wing tip you will see the leading edge has a pronounced curve. Cut four or five V-notches on the **back side** of the leading edge to help the balsa take on the curved shape. Wetting the balsa with water will also help to bend the wood.



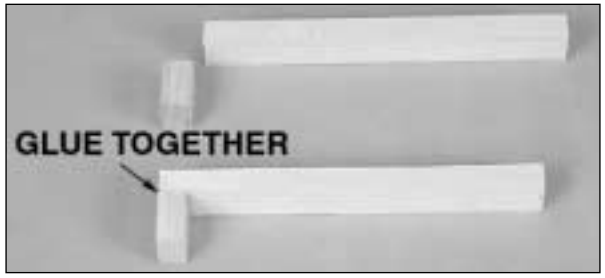
❑ ❑ 16. When you have the correct curvature, glue the leading edge to the front of the ribs.



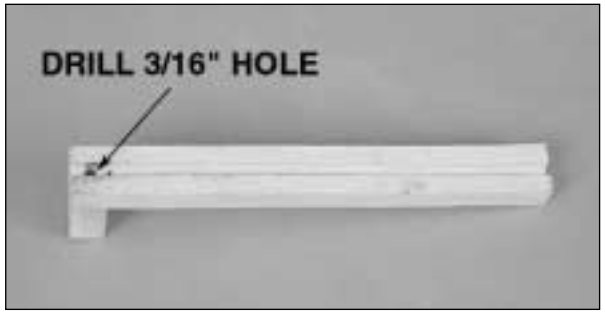
❑ ❑ 17. Glue the **basswood servo bay rails** into the notches in W8 and W9 with 6-minute epoxy. These should be cut from the 1/4" x 3/8" [6.4 x 9.5mm] basswood stock that was leftover from the wing spars.

Complete Steps 18 - 22 only if you are installing the fixed gear. If you are installing retracts skip ahead to: Installing the retracts.

❑ ❑ 18. Locate the two **1/2" x 3/4" x 6-3/4" [12.7 x 19.1 x 171mm] grooved basswood landing gear mounts** and the **1/2" x 3/4"x 1" [12.7 x 19.1 x 25.4mm] maple fixed gear blocks**.

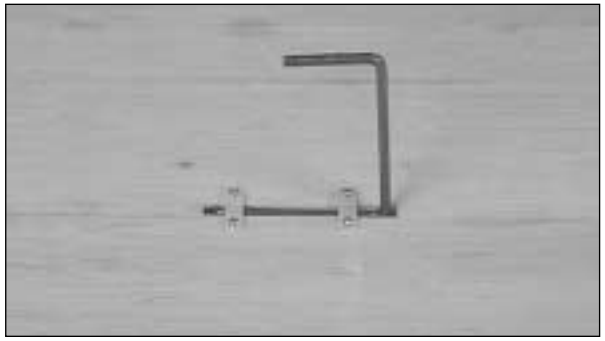


❑ ❑ 19. Glue the maple fixed gear block to the grooved landing gear block with 30-minute epoxy.



❑ ❑ 20. When the glue has cured, drill a 3/16" [4.8mm] hole through the grooved block and the maple block.

❑ ❑ 21. Glue the landing gear block assembly into the slots in the wing with 30-minute epoxy. Be sure to get a good bond between the maple block and W4.

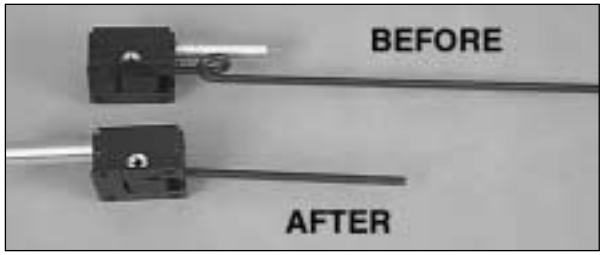


❑ ❑ 22. *Do not* sheet the wing at this time. When it is time to do the final wing sheeting, cut the sheeting to fit the gear as shown in the photograph.

If you have installed the fixed gear, skip the following 6 steps.

Retract Installation (Main Gears)

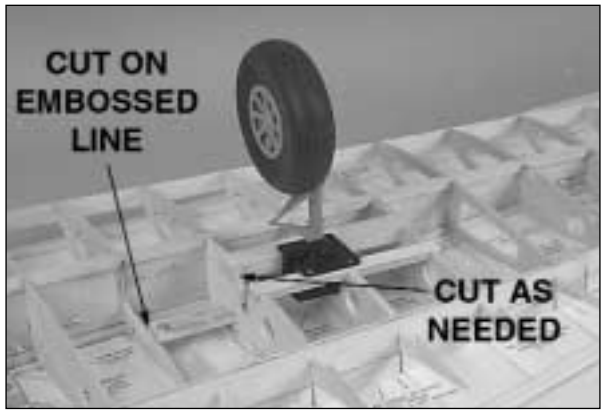
We have designed this kit around the Robart #TFP39 Nose Gear Retract and the #606 HD 85-degree main gear retract. If you have chosen to install the retractable gear, you should already have the nose gear installed. The following steps show the installation method for the main gear.



❏ Before starting on any of the landing gear installation move the air cylinder to the other side of the retract unit as shown in the photograph. This is very easy and the full instructions are included with the Robart landing gear. Please refer to the instructions included with the retracts. You will also need to cut the 3/16" [4.8mm] wire to a length of 4-7/8" [124.2mm]. Cut the wire so that the coil is no longer a part of the wire. This length is the proper length if you are using the recommended 4"[102mm] tires.

❏ ❏ R1. Cut the 1/4" x 5" x 16" [6.4 x 127 x 406mm] plywood rail to a length of 5-3/4" [146mm] and test fit it into the aft notches in ribs W4, W5 and W6.

❏ ❏ R2. Cut the grooved landing gear block to 5-3/4" [146mm] in length. Test fit this into the notches in the wing. When you are satisfied with the fit, use 30-minute epoxy to glue the plywood rail and the landing gear block into place. Be sure that when you glue the landing gear block in place you glue it in with the groove towards the top of the wing.



❏ ❏ R3. Cut the embossed lines on W3 to open the wheel cavity. Using your retract landing gear as a guide, cut away the portion of W5 that is needed to make clearance for the air cylinder.
Note: *The plastic strut cover shown is an optional item. See the Retract items on page 3 for the part number*.

❏ ❏ R4. When you are satisfied there is adequate clearance, mark the position for the landing gear and drill holes for the mounting screws in the hardwood rails. Also, drill a hole in W6 to allow for the air line to pass through.

❏ ❏ R5. Though this is not absolutely necessary, we recommend that you create a wheel well in the wing. This will help to support the wing sheeting after the final hole has been cut in the sheeting of the wing. Our wheel well was made from some .030" plastic sheet. You can do this or use balsa, lite ply or even some poster board material. Be sure to support the wheel well with some leftover balsa.

If you choose not to make a wheel well, be sure to add some additional balsa around the well so that you have something to glue the sheeting to.

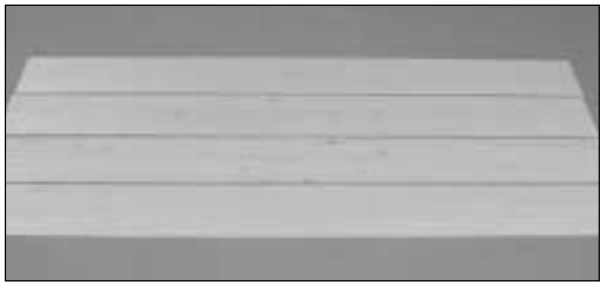
❏ ❏ R6. Install all of the retract air lines through ribs W1 - W6.

P-39 Fact

The Airacobra was never outstanding in combat and was shunned by the American and British pilots. However, it was excellent for low-level operations against ground targets and used successfully by the Soviets who scored an impressive number of air victories.

Sheet The Bottom Of The Wing

❏ ❏ 1. Remove the T-pins. Use a sanding bar to sand the LE, TE spars and ribs so they are smooth and even. Be careful not to change the shape of the ribs.



❏ ❏ 2. Glue four sheets of 1/16" x 3" x 30" [1.6 x 76 x 762mm] balsa together in the same manner as you did for the horizontal stabilizer. This will create the bottom wing skin.

❏ ❏ 3. Cut the skin to the shape of the wing, but cut it approximately 1/4" [6.4mm] larger than the wing. This will provide a bit of excess when positioning the skin. Save the excess that was cut away for later use in the sheeting process.

❏ ❏ 4. Glue the skin to the wing ribs and spar. Use an aliphatic glue for this. Tape the leading and trailing edges of the sheet to the leading and trailing edge of the wing. Hold the skin in place on the ribs with a few weighted bags.
Note: *DO NOT GLUE the skin to the area around the aileron hatch cover. This will be cut away in the next step. Gluing the skin to the spar around the hatch will make it difficult to cleanly remove the hatch*.

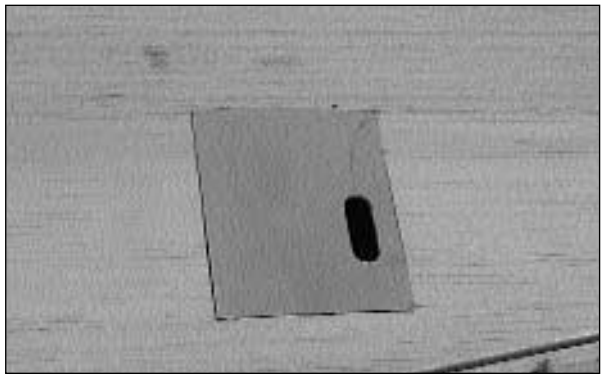
❏ ❏ 5. After the glue has dried, cut away the openings for the landing gear and the aileron servo hatch. Start by cutting the hatch opening under size and carefully enlarge it using a fresh #11 blade and a straightedge until the die-cut 1/16" [1.6mm] ply hatch cover fits.
Hint: As you zero-in on the final shape of the hatch opening, use the hatch cover itself as a template to finalize the exact shape and size of the opening.

❏ ❏ 6. Use thin CA to adhere the sheeting at the aileron hatch opening and the wheel well.

❏ ❏ 7. Cut the trailing edge support on the embossed line.

Installing the Aileron Servos

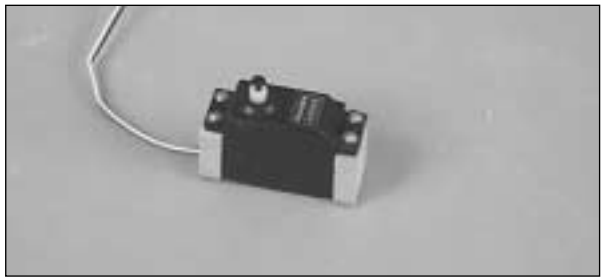
This is a good time to get the aileron servos installed. Doing it now will make it easy to run the wires and get the hatches to fit.



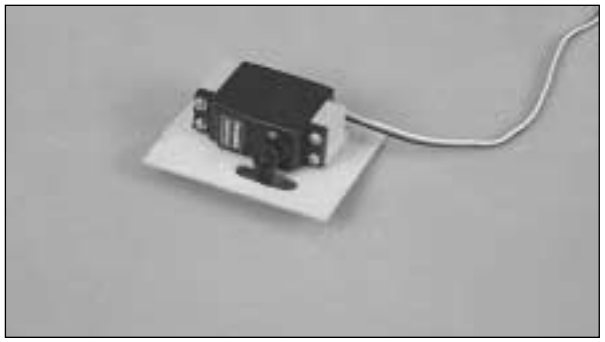
❏ ❏ 1. Locate the die-cut 1/16" [1.6mm] **aileron servo hatch** and fit it to the opening in the wing.

❏ ❏ 2. Use six of the **#2 X 3/8" [9.5mm] flat head sheet metal screws** to mount the hatch to the servo rails. Place the hatch cover on the servo hatch rails making sure it is in the correct orientation as shown on the plan. Drill 1/16" [1.6mm] holes through the punch marks in the hatch cover into the rails.

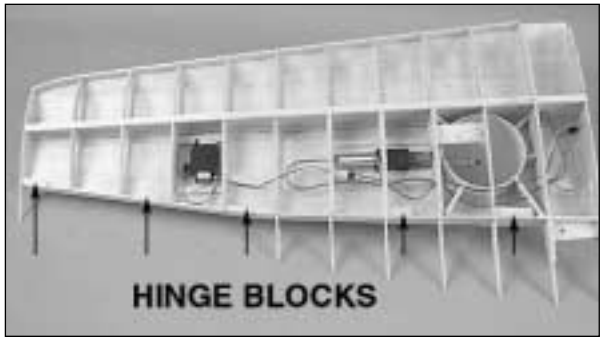
Enlarge the holes in the hatch cover only with a 3/32" [2.4mm] drill bit. Countersink the holes for the #2 x 3/8" [9.5mm] flat head screws with a countersink or Dremel #178 bit. Test fit the hatch cover to the rails with the screws. If necessary, sand the edges of the hatch cover so they align with the edges of the hatch opening.
Note: If you find it difficult to countersink the holes in the hatch cover for the flat head screws, you could use regular #2 x 3/8" [9.5mm] screws (not supplied) and not countersink the holes.



❏ ❏ 3. Locate two of the 5/16" x 3/4" x 7/8" [7.9 x 19.1 x 22.2mm] basswood **aileron servo mounting blocks** and mount the servo to the blocks.



❏ ❏ 4. Use some coarse sandpaper to roughen the inside of the ply hatch and the end of the mounting block. Glue the mount to the hatch with 30-minute epoxy, centering the servo arm over the opening in the door. Secure the blocks in position by screwing the block to the hatch with one #2 x 3/8" [9.5mm]flat head screw in each block



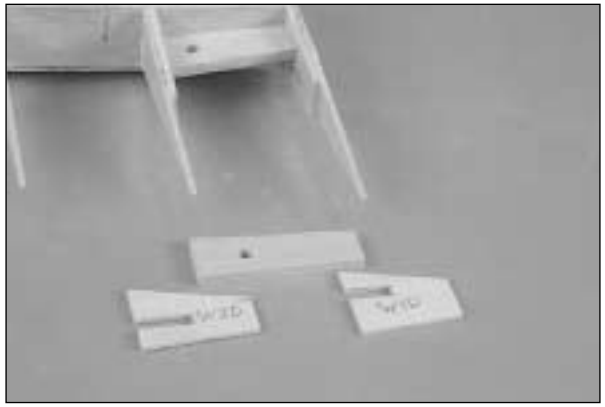
❏ ❏ 5. Cut the aileron and flap hinge blocks to the size shown on the plan and glue in place. Trim any excess wing sheeting. Sand and shape the leading edge and wing sheeting.

That's it for the bottom of the left wing. Build the right wing half, by repeating the same steps!

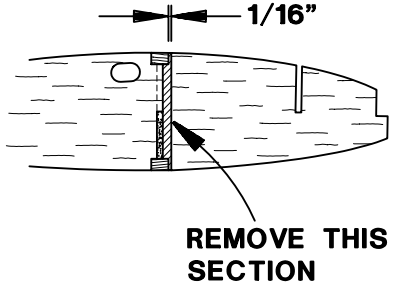
Joining the Wing Halves

❏ 1. Locate the two die-cut **Leading Edge Dowel Braces** and glue them together with 5-minute epoxy.

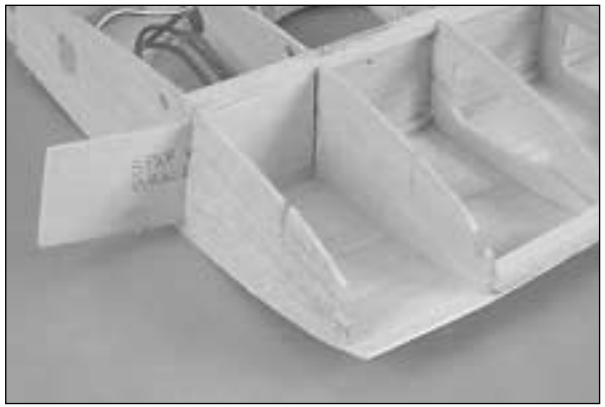
❏ 2. Locate four die-cut **Wing Bolt Mounting Plates**. Glue two of them together with 5-minute epoxy. Do the same for the remaining two plates.



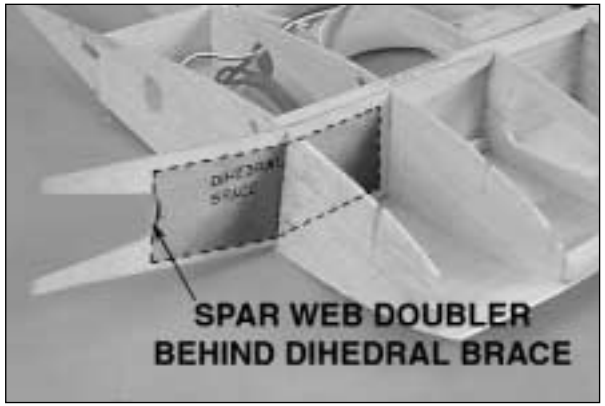
❏ 3. Using 5-minute epoxy, glue a wing bolt mounting plate in position in the slot between W1 and W2. Glue the **doubler W1D and W2D** in position on ribs W1 and W2 to support the mounting plate. Do this for both wing panels.



❏ 4. Cut a slot in W1 and W2 as shown in the sketch. This slot is needed to allow clearance for the die-cut 1/8" ply [3.2mm] **wing spar web brace** and the die-cut 1/16" [1.6mm] ply **dihedral brace**. Do the same for the other wing panel.



❏ 5. Test fit the wing spar web brace into the slot you cut into the ribs.



❏ 6. Test fit the dihedral brace into the slot and make sure it fits well with the spar web brace.

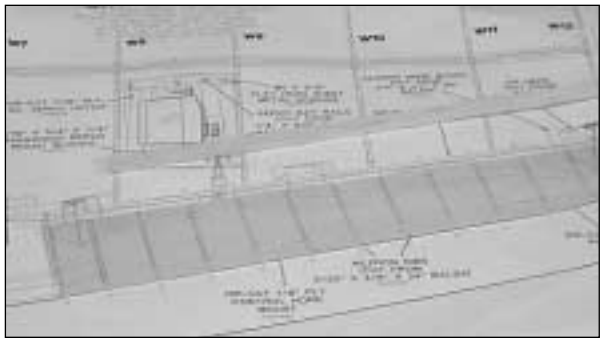
❏ 7. Use 30-minute epoxy to glue the wing spar web brace and the dihedral brace to *one wing panel*. Be sure to use enough epoxy to assure a good bond of the web brace, dihedral brace and the spars. When the glue has fully cured we will glue the two halves together.

❏ 8. For this step it will be helpful to position something under the wing so that you can give support to the two wing halves while they are being joined together. Use 30-minute epoxy to permanently join the two wing halves together. Glue the spar web brace and the dihedral brace into the other wing panel. Use small clamps to hold the wings together, making sure you get a good joint between the wing spars and the two W1 ribs.

❏ 9. Once the wing is clamped together, epoxy the die-cut 1/8" [3.2mm] ply **LE dowel brace** and the **aft dowel brace** into position. Set the wing assembly aside to dry.

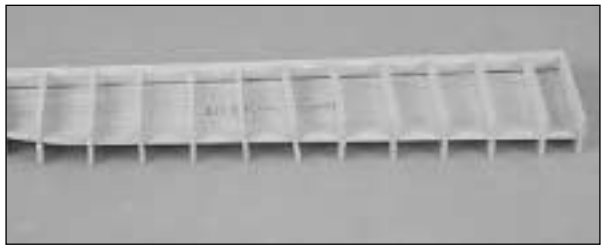
Install the Ailerons

❏ ❏ 1. Locate one of the two die-cut 3/32" [2.4mm] balsa aileron cores. Pin it over the plan.



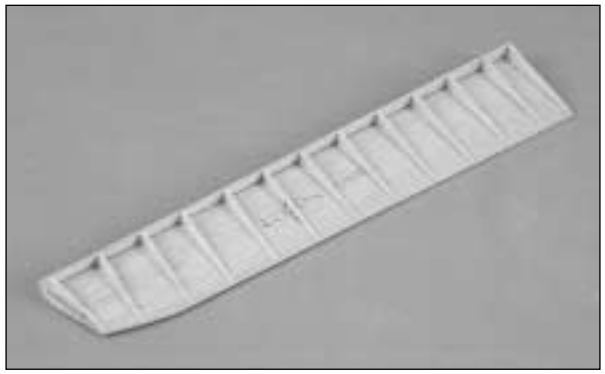
❏ ❏ 2. Mark the location where the ribs will be glued to the aileron core by connecting the marks on the plan. Draw these lines on both sides of the aileron core.

❏ ❏ 3. Locate a **1/4" x 3/4" x 24" [6.4 x 19.1 x 610mm] balsa stick** and mark a centerline on both sides of it. Glue the aileron core on the centerline. Use the same procedure that was used in making the elevator cores.



❏ ❏ 4. Use **3/32" x 3/8" x 24" [6.4 x 9.5 x 610mm] balsa sticks** to make the ribs. Glue them onto both sides of the ailerons at the location that you previously marked.

❏ ❏ 5. Sand the ribs to the shape shown on the plan.



❏ ❏ 6. Shape the aileron leading edge to a V-shape as shown on the plan. Use the centerline that you drew as a guide when shaping.

❏ ❏ 7. Cut the hinge slots in the aileron and the wing as indicated on the plan. Use the same slotting method used for the elevators and rudder.

❏ 8. Do the same for the other aileron.

Build the Flaps

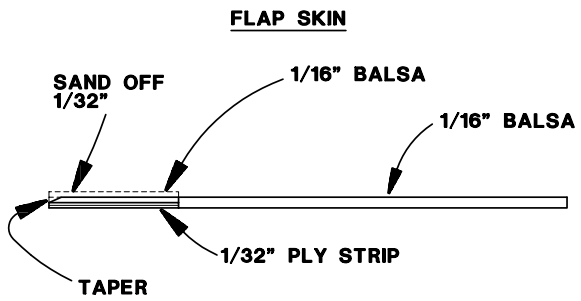
Perform steps 1-20 only if you are building working flaps. If you are not building working flaps go to step 21.

❏ 1. Cut two servo mounting rails from the leftover 1/4" x 3/8" [604 x 9.5mm] basswood sticks that were used for the wing spars. Glue them in position as shown on the plan. Mount the flap servo to the rails.

❏ 2. Install the threaded ball onto the servo arm. After installing the ball, place the dual-end ball link connector onto the ball.

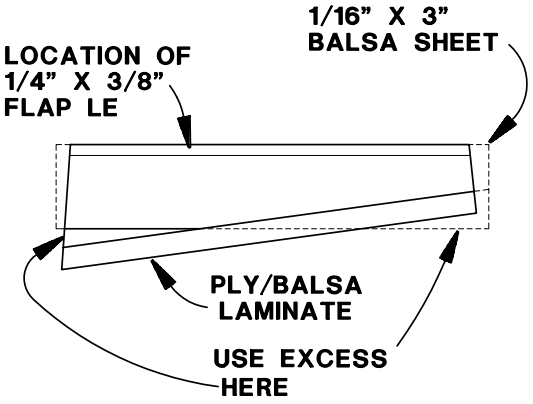
❏ 3. Use one 2-56 x 6" [152mm] threaded rod, one 2-56 x 12" [305mm] threaded rod, two clevises and two solder-on threaded couplers to make the flap pushrods. Make sure the servo is in position with the dual-end ball link connector in place so you can use it to determine the proper length for the pushrods.

Make the right flap first, followed by the left flap.



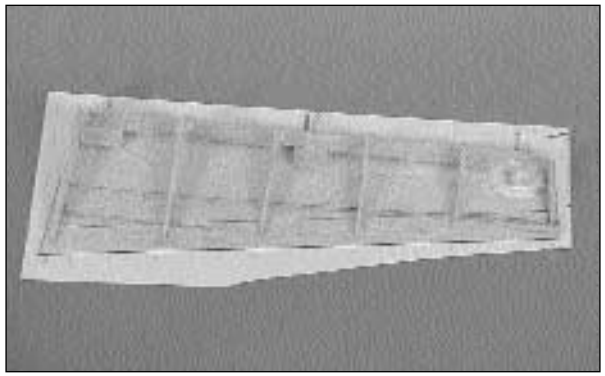
❑ ❑ 4. Refer to the sketch above. Use medium or thick CA to glue a **1/32" x 3/4"x 14-1/2" [0.8 x 19.1 x 369mm]** plywood strip on top of a piece of 1/16" [1.6mm] balsa sheet. Use a piece of leftover wing sheeting for this. Trim the balsa to be the same size as the plywood.

❑ ❑ 5. Sand 1/32" [0.8] from the balsa so that the total thickness of the laminated piece is 1/16"[1.6mm]. This laminated piece will become the flap trailing edge. Sand a taper on the balsa/plywood trailing edge.



❑ ❑ 6. Make a skin for the bottom of the flap. The flap skin will consist of the laminated flap TE, a new 1/16" x 3" x 30" [1.6 x 76 x 762mm] balsa sheet and a piece of 1/16" [1.6mm] sheeting that was left over from the trimmed wing sheeting. Use the plan to cut the sheet to the correct shape. Glue the three pieces together as shown in the sketch with the ply facing down.

❑ ❑ 7. Locate flap ribs **FR2-FR7** and a **1/4" x 3/8" x 24" [6.4 x 9.5 x 610mm] balsa stick**.



❑ ❑ 8. Pin the balsa flap skin over the flap plan. Be sure the plywood on the trailing edge is facing down on the plan. Mark the location for the flap ribs on the skin, using the tick marks on the flap plan.

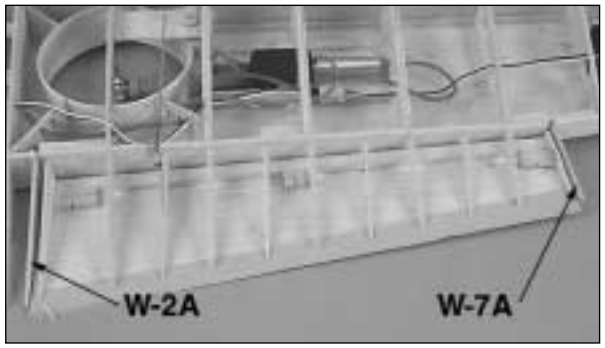
❑ ❑ 9. Cut the 1/4" x 3/8" x 24" [6.4 x 9.5 x 610mm] balsa stick to the length of the leading edge of the flap skin shown on the plan. Glue the balsa stick and flap ribs FR2- FR7 to the flap skin and the balsa leading edge.

❑ ❑ 10. Cut the flap hinge blocks from 1/4" x 1/2" x 24" [6.4 x 12.7 x 610mm] balsa and glue them into position as shown on the plan.

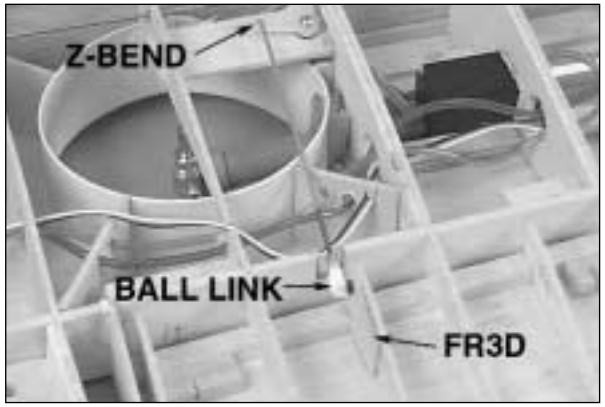
❑ ❑ 11. Drill 3/32" [2.4mm] holes in the hinge blocks for the pivot point hinges. Do not glue the hinges in place yet.

❑ ❑ 12.Test fit the flap to the trailing edge of the wing. Make sure when the flap is in the up position that it is resting on the wing ribs and that the flap ribs fit the wing trailing edge. Check to make sure that the flap has approximately 2" [51mm] of down travel. The cross section view of the flap on the plan shows how to shape the flap LE.

❑ ❑ 13. Position the flap and mark the hinge locations on the trailing edge of the wing. Drill 3/32" [2.4mm] holes for the hinges in wing trailing edge.

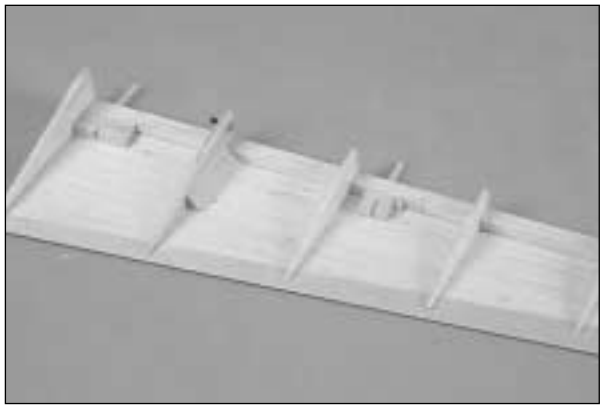


❑ ❑ 14. Test fit formers **W2A and W7A** in the position shown on the plan. Trim the ends of the flap to get a good fit of the flap between W2A and W7A. When you are satisfied with the fit, glue W7A and W2A into position on the wing TE.



❑ ❑ 15.Locate die-cut part **FR3D**. Drill a 3/32" [2.4mm] hole at the punch mark. Glue FR3D to FR3. Drill a 3/32" [2.4mm] hole through FR3 at the hole in FR3D.

❏ ❏ 16. Locate the **2-56 ball, ball link socket and 2-56 nut**. Attach the ball through FR3D and FR3 and retain it with the nut. After tightening the nut put a small drop of CA on the threads to prevent it from loosening.



❏ ❏ 17. Cut a small piece of leftover 3/8" [9.5mm] triangle stock and glue it to FR3 and the flap skin.

❏ ❏ 18. Cut a slot through the trailing edge of the wing, just large enough for the 2-56 pushrod. See the photo at step 16.

❏ ❏ 19. Cut one of the 2-56 x 12" [305mm] pushrods to fit from the bellcrank to the ball link. Make a Z-bend in the wire and attach it to the bellcrank as shown on the plan.

❏ 20. Repeat steps 4-19 for the left flap.

Sheeting the flap area when flaps are not used.

Perform steps 21 and 22 only if there will **not** be working flaps.

❏ ❏ 21. Use a new 1/16" x 3" x 30" [1.6 x 76 x 762mm] balsa sheet and a piece of 1/16" [1.6mm] sheeting that was left over from trimming the wing sheeting to make the skin for the flap area. Edge glue the two skins together and cut them to fit onto the wing using the flap plan as a guide.

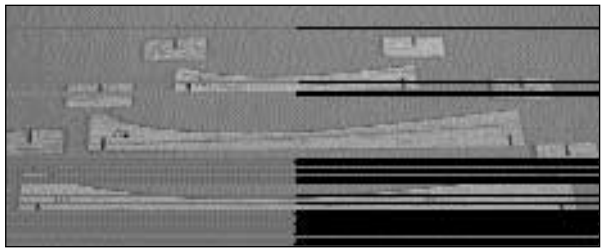
❏ ❏ 22. When satisfied with the fit, glue the skin in place to the wing.

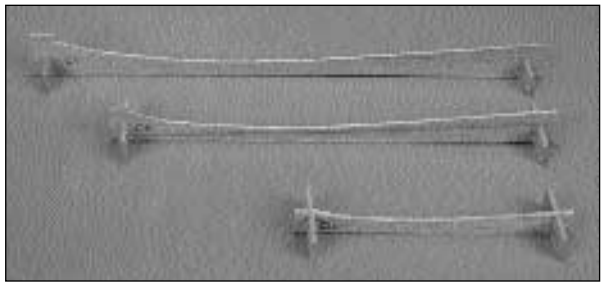
P-39 Fact

Approximately 9,560 Airacobras were produced, about half of which were sent to Russia under the Lend-Lease program.

Sheet the top of the Wing

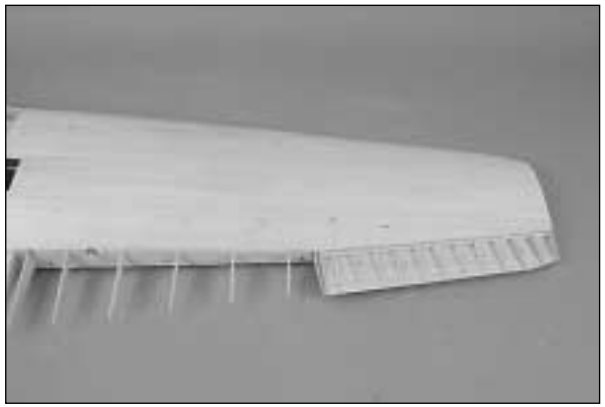
❏ ❏ 1. Glue four of the 1/16" x 3" x 30" [1.6 x 76 x 762mm] balsa sheets together in the same way as you glued the other sheeting. After the glue has dried, cut the sheeting to the outline of the wing. Be sure to save the portion of the sheet that you cut away at the leading edge. This will be used in step 5. **Note**: The sheeting will not cover the entire top of the wing. The flap area will not be sheeted in this step.



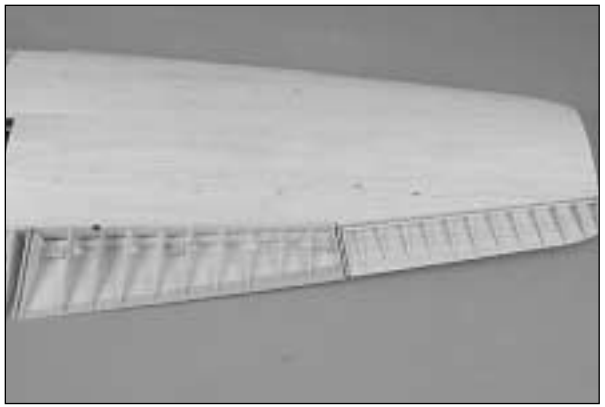


❏ ❏ 2. Locate balsa parts C1, C6, C11 and six wing jig braces. Assemble three wing jigs as shown in the photographs.

❏ ❏ 3. Support the wing with the three wing jigs. Place C1 at the wing root, C11 at the wingtip and C6 centered in the middle of the wing. Glue the sheeting in place on the wing using the same method as the bottom of the wing. Trim the sheeting at the LE, tip and TE after it has dried.



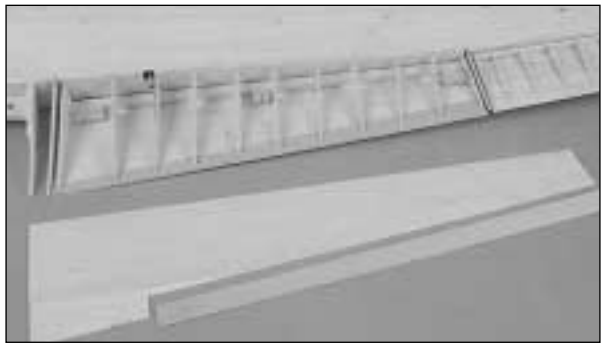
❏ ❏ 4. Test fit the aileron. Sand the aileron to fit between the ribs with 1/16" [1.6mm] clearance at each end of the aileron. Sand the ailerons to match the airfoil of the wing.



❏ ❏ 5. Test fit the flaps into position. Sand as needed to fit the flaps between the ribs with 1/16" [1.6mm] clearance at each end.

❏ ❏ 6. Make a skin to cover the flap area from another of the 1/16" x 3" x 30" [1.6 x 76 x 762mm] balsa sheets and the portion of the skin that was cut away when you sheeted the top of the wing in step 1. Glue the two sheets together.

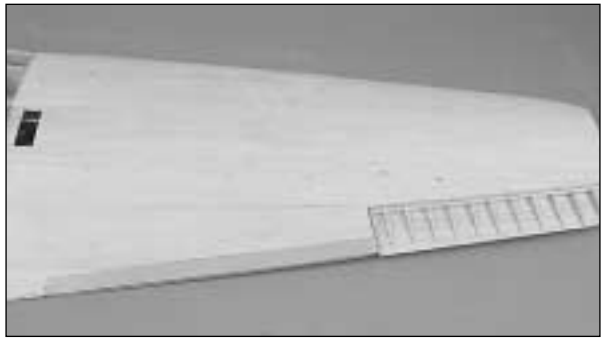
❏ ❏ 7. Cut a 1/32" x 3/4" x 14-1/2" [0.8 x 19.1 x 369mm] plywood strip like your did for the bottom of the flap.



❏ ❏ 8. Lay the plywood strip on the trailing edge of the wing sheeting and cut a 3/4" [19.1mm] strip of the balsa skin away as shown in the photograph. Glue the balsa strip to the 1/32"x 3/4"x 14-1/2 [0.8 x 19.1 x 369mm] ply. Sand the balsa side of this assembly so that the total thickness of the two pieces is 1/16"[1.6mm], the same thickness as the rest of the wing skin. Edge glue the balsa and ply strip back into the wing skin with the ply strip on the top.
.

❏ ❏ 9. Sand a taper on the balsa / plywood trailing edge the same way as was done with the bottom of the flap. Refer to the sketch in step 5 of "Building the Flap".

Perform step 10 **only** if you are building working flaps.

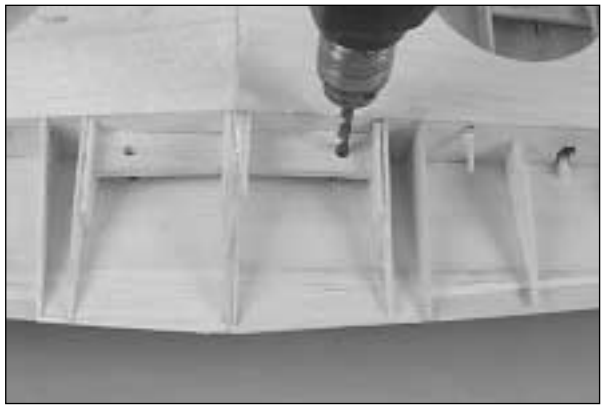


❏ ❏ 10. Glue the final portion of the wing skin into position on the ribs.

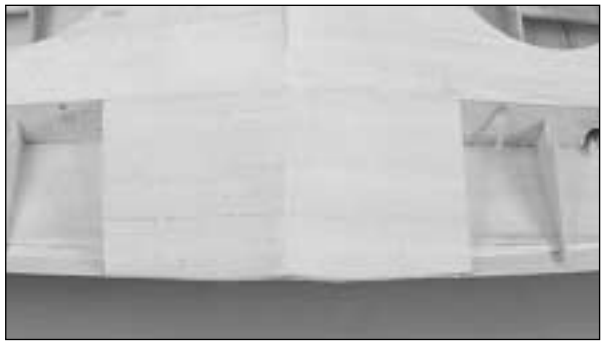
Perform step 11 only if you are **not** building working flaps.

❏ ❏ 11. Glue the final portion of the wing skin into position on the ribs and to the bottom wing skin at the wing TE.

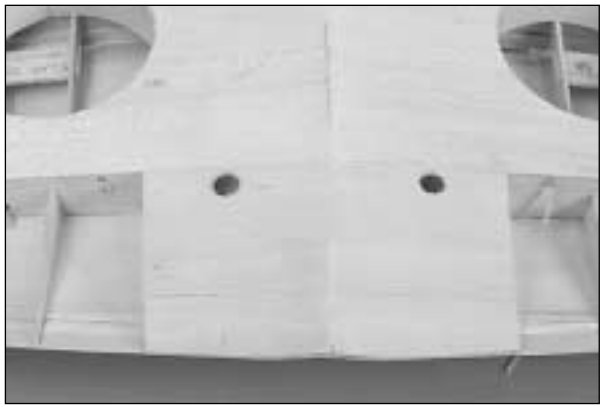
❏ 12. Do the same for the other side of the wing.



❏ ❏ 13. Insert a leftover piece of 1/8” balsa between the wing mounting block and the wing skin. Use a 1/8" [3.2mm] drill to drill a hole through the wing mounting block and through the skin sheeting on the top of the wing. This will provide a pilot hole to help locate where to drill once the center gets sheeted.



❏ ❏ 14. Use pieces of the remaining 1/16" [1.6mm] sheeting to sheet the remaining center section of the bottom of the wing.

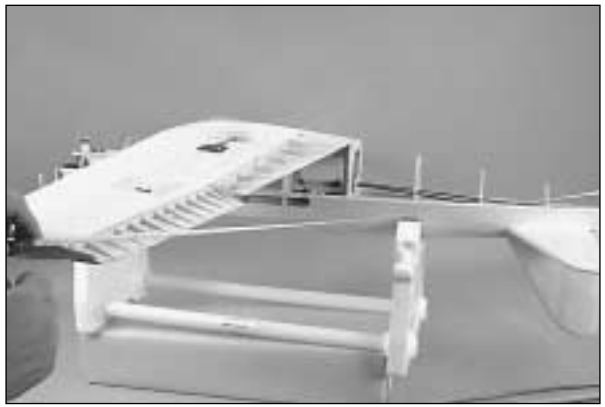


❏ ❏ 15. Using the 1/8" [3.2mm] pilot hole as a guide, drill through the pilot holes from the top of the wing through the bottom center section sheeting. This will give you a proper alignment for the wing bolts. Once the hole has been drilled, enlarge the diameter of the hole in the bottom sheeting to allow the head of the **1/4 - 20 nylon wing bolt** to pass through the skin and tighten down onto the wing bolt mounting plate. Glue a piece of the cardboard **wing bolt tube** in the hole between the sheeting.

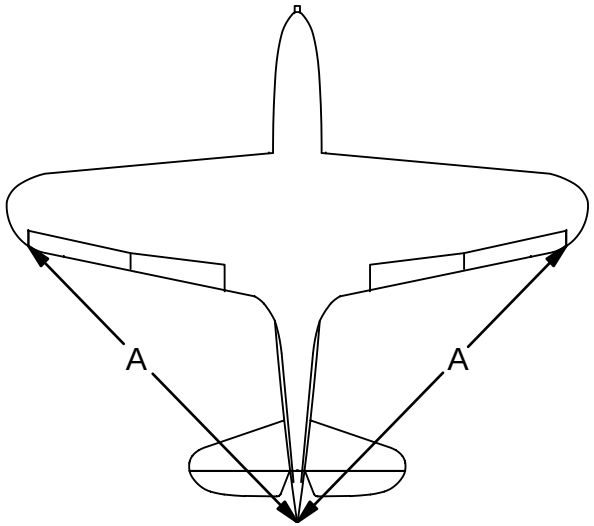
❏ ❏ 16. Glue the shaped balsa **wing tips** to the end of the wing. Shape to match the airfoil of the wing. Use the plan as a guide for the final shape.

Fit the wing to the fuselage

❏ 1. Test fit the wing onto the wing saddle. Be sure that the center of the LE is at the center of F3A.



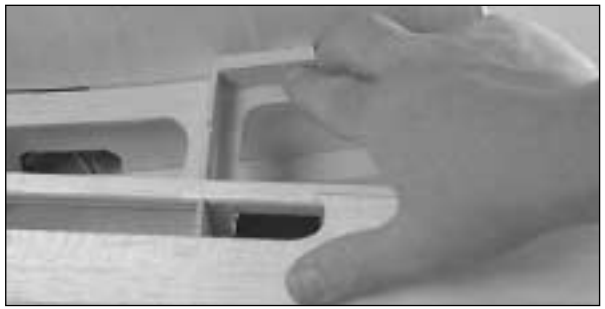
❏ 2. Wing alignment is important to good flight characteristics so take your time to do it correctly. With the wing in the saddle, visually check the alignment of the wing in relation to the horizontal stab. If needed, sand a small amount of the wing saddle until the wing is parallel to the horizontal stab.



❏ 3. Measure the distance from the right wing tip to the center of the fuselage at the tail. Do the same for the left side of the fuselage. Make adjustments to the wing position until the distance from the fuselage to each wing tip is the same. When you are satisfied, mark the exact wing location on the fuselage.

❏ 4. From the front of the fuselage, drill two 1/4" holes through the existing holes in F3 and F3A and into the ply LE dowel brace of the wing. Make sure that you drill the hole through the ply LE dowel brace and the aft dowel brace. A long drill bit will be helpful in doing this step, but if you have only a standard bit, drill through the LE dowel brace, then remove the wing and drill the hole through the aft dowel brace. With the wing off of the fuselage the standard bit will reach all the way through.

❏ 5. Glue each of the **1/4" x 3" [6.4x 76mm] wood dowels** in place in the holes you drilled. The dowels should extend out of the dowel brace 3/8" [9.5mm] . Round the end slightly to help the dowel easily slide into the fuselage. A small amount of epoxy spread on the dowels should be more than adequate to retain the dowels.

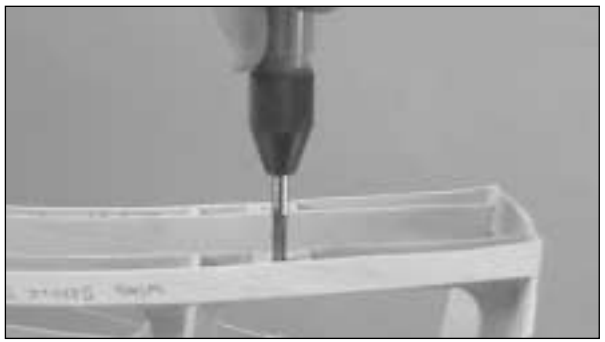


❏ 6. When the glue has cured on the dowels, place the wing in position in the saddle. Place the **1/4"x 3/4" x 2" [6.4 x 19 x 51mm] wing bolt plates** in position under the holes in the wing. Mark these locations on the side of the saddles.

❏ 7. Use 30-minute epoxy to glue the blocks in place on the saddles. Clean any excess epoxy from the block. Glue some leftover 3/8” tri balsa to the block and wing saddle to reinforce the joint.

The parts you have just glued together are going to take some time to cure. This would be a good time to cut out and assemble the plastic parts that are on page 38 of the manual.

❏ 8. After everything has cured, put the wing back in position on the saddle and double check to make sure the wing is properly positioned. When you are satisfied with the fit, drill a #10 (or 13/64") [5.2mm] hole through the holes in the wing and through the mounting blocks you just glued into position. The #10 (or 13/64") [5.2mm] drill is the proper diameter for tapping the mounting block.

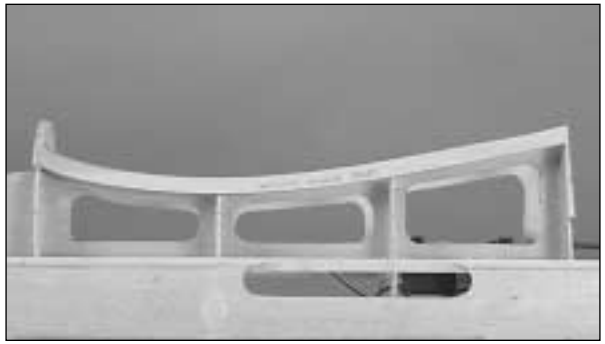


❏ 9. Remove the wing and tap the holes in the mounting block with a 1/4 - 20 tap. Wick some thin CA into the threads to harden them. Allow the CA to cure fully. Run the tap through the threads again to clean up the threads. Drill out the holes in the Wing Bolt Plate only with a 17/64" [6.7mm] bit.

P-39 Fact

Production models of the P-39 started arriving at Air Corps squadrons in January 1941; six months later the first Airacobras reached England. The British had planned to order 675 of the planes, but after disappointing combat experience, the order was canceled.

FINISH THE LOWER FUSELAGE



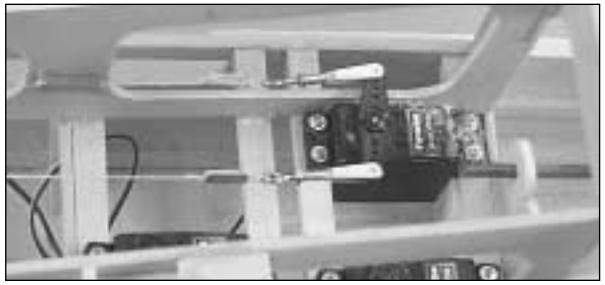
❏ 1. Glue the die-cut balsa **wing saddle doubler** onto each side of the fuselage. Some sanding of the doubler *is going to be required* in order to match the shape of the wing saddle. Make sure that you test fit the wing to the fuselage before you glue the saddle doubler in place. The saddle doubler should uniformly contact the wing along the entire chord length.

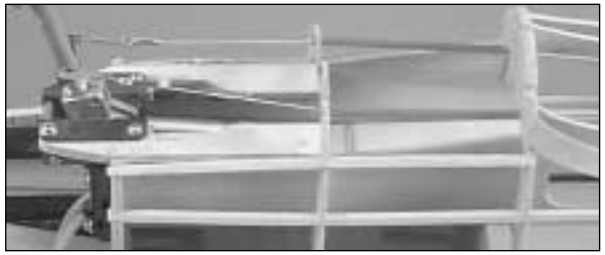
❏ 2. Glue the remaining 3/16" [4.8mm] stringers to the rear of the fuselage the same way you did with the top half. The stringer at the middle of the fuselage side runs the full length of the fuse. Splice two stringers together the same way you did the top stringers. Make one for each side.

Nose Gear Steering Pull-Pull System installation.

This step is only if you have retracts installed.

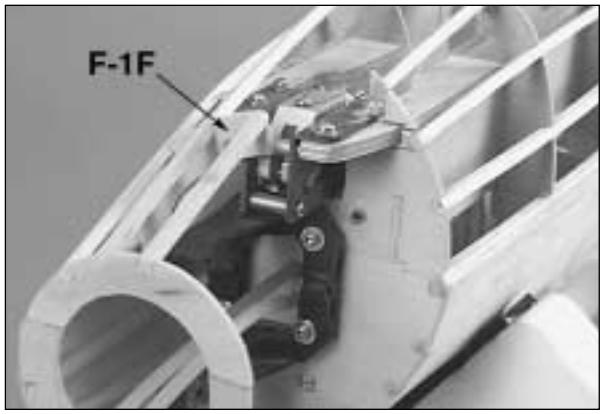
We will use the Sullivan Pull-Pull System (SULQ3121)



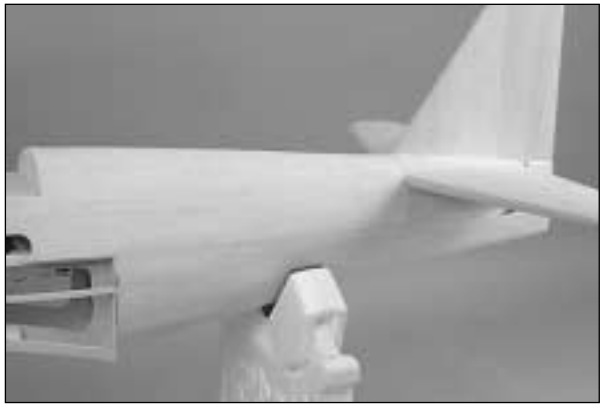


❏ R1. Attach the cable to the servo arm and the nose steering arm following the instructions included in the Pull-Pull kit.

❏ R2. Retract the nose gear with the cable in place and make sure there is clearance for the cables as they retract into the nose of the model. Make adjustments to the landing gear plate as needed.

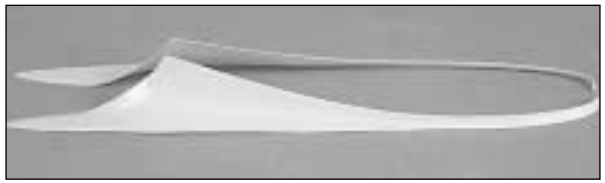


❏ 3. Glue former F1F into position on the stringers and glue the remaining center stringer in position. This will provide something to which the sheeting can be glued.

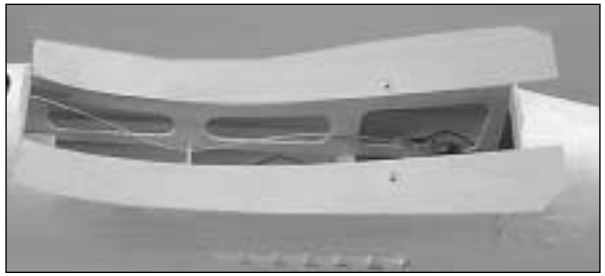


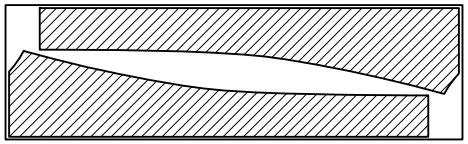
❏ 4. Sheet the back half of the fuselage from the tail to the wing saddle using 3/32" x 3" x 30" [2.4 x 76 x 762mm] balsa sheet.

❏ 5. Sheet the rest of the fuselage from the wing saddle forward to the nose using 3/32" x 3" x 30" [2.4 x 76 x 762mm] balsa sheet. Some wetting of the wood will probably be necessary to make the balsa conform to the stringers at the nose. *Reminder! Now is a good time to wet the front of the fuselage as instructed on page 25 step 50.*



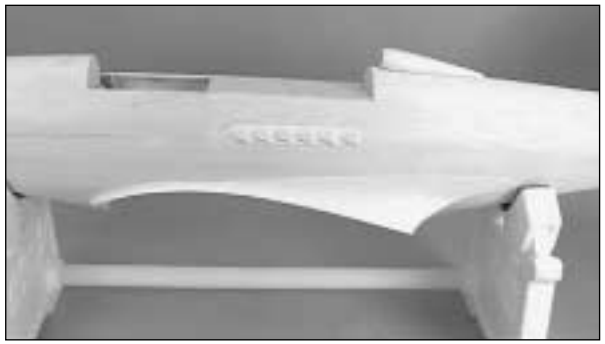
❏ 6. Cut out the two **plastic wing fillets**. Sand the inside edges of the fillets to improve the glue bond.



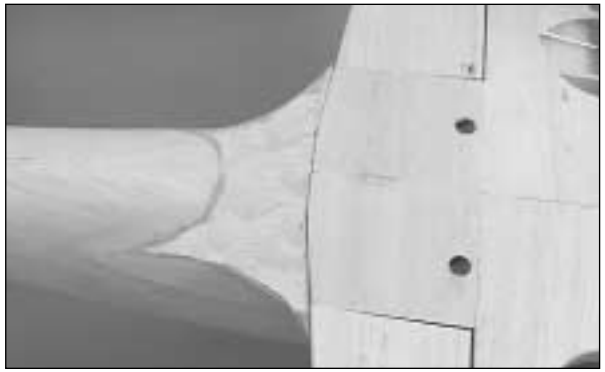


❏ 7. Cut the 1/32" x 5" x 17" [0.8 x 127 x 432mm] ply into two pieces as shown in the sketch. Use the outline on the top view of the fuse plan as a guide. Test fit them to the wing saddle and the wing saddle doubler. Mark the location of the 1/4-20 bolt holes and drill 17/64" [6.7mm] holes in the ply wood sheeting. When everything is aligned, glue the sheeting in place to the wing saddle and the wing saddle doubler.

❏ 8. Bolt the wing onto the fuselage. Carefully fit the plastic fairings to the fuselage side and the 1/32" [0.8mm] ply. The sharply curved tip of the fairing where it meets the fuselage and the leading edge of the wing should be cut away to allow clearance for the wing to be removed. Once you are satisfied with the fit, glue the fairing to the fuselage and the ply. **Hint**: Thin CA with a micro tip works well to glue the fairing in place with minimal excess glue.



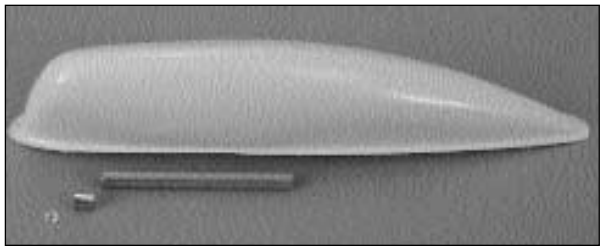
❏ 9. Once the fairing is glued in place, trim away the excess 1/32" [0.8mm] plywood sheeting. Blend the fairing to the fuse with a lightweight filler.

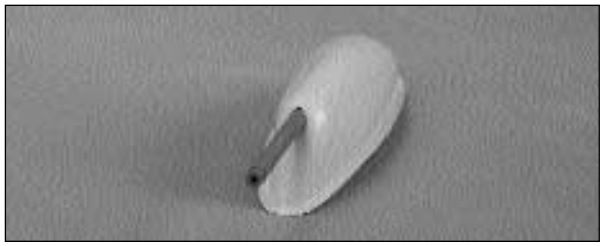


❏ 10. Using leftover balsa and filler, make a fairing on the underside of the fuselage where the saddle and fuselage come together. Do the same to create a nice blend where the leading edge of the wing and the fuselage come together. Use the 1/2” x 1-1/4” x 6” [12.7 x 31.7 x 152] balsa block to fair the wing LE to the fuselage.

❏ 11. Glue the 1/16” balsa fin/fuselage fillet in place as shown on the plan.

❏ 12. Cut the plastic air scoop and glue the two halves together. After they have been glued together cut out the front of the scoop to form the air intake. *See photo in step 9.* Glue the scoop in place after it has been painted and the fuselage has been covered.

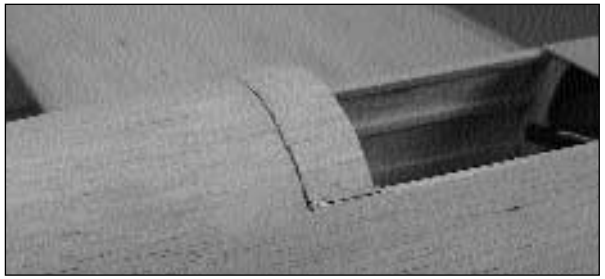




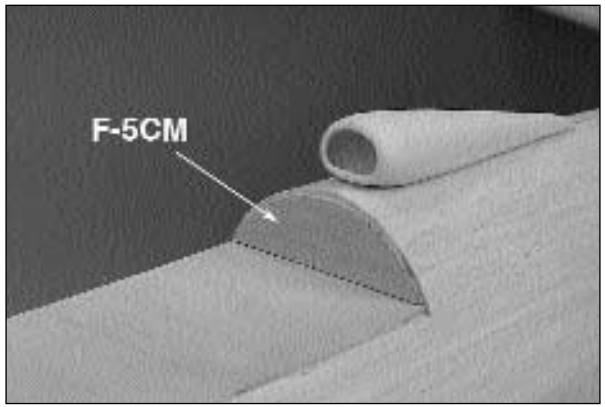
❏ 13. Cut out the two plastic cannon pods. We made the cannons from 3" x 1/4" [76 x 6.4mm] brass tube, 7/32"x 1/2" [5.6 x 12.7mm] brass tube and a #2 washer (*cannon parts are not included in the kit*). Glue the 7/32" [5.6mm] tube into the 1/4" [6.4mm] tube. Glue the #2 washer to the end of the 7/32" [5.6mm] tube to form the gun barrel. Sharpen the end of an additional 1/4" [6.4mm] brass tube and use it to cut a hole in the cannon pod. Glue the cannon into the center of the pod.

❏ 14. Glue on the air scoop, exhaust stacks and gun pods after they have been painted and the model has been covered.

Canopy Installation



❏ 1. Trim the canopy to fit onto the stringer at the top of the cockpit deck. Mark where the canopy rests on the top of the fuselage. Sand that area so that when the canopy is attached it will be flush with the fuselage.

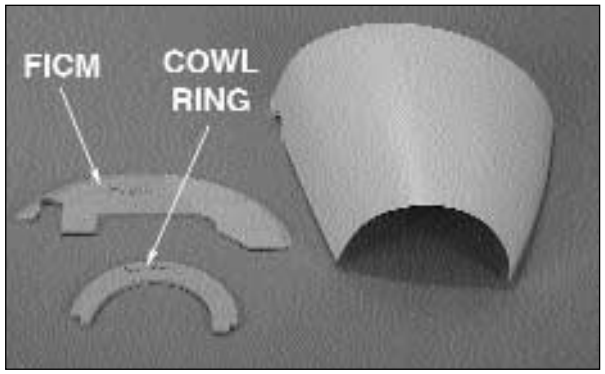


❏ 2. Glue former F5CM at the back of the cockpit. This will give you a surface to glue the canopy to. Before painting the canopy read the painting recommendations in the Finishing section of this manual.

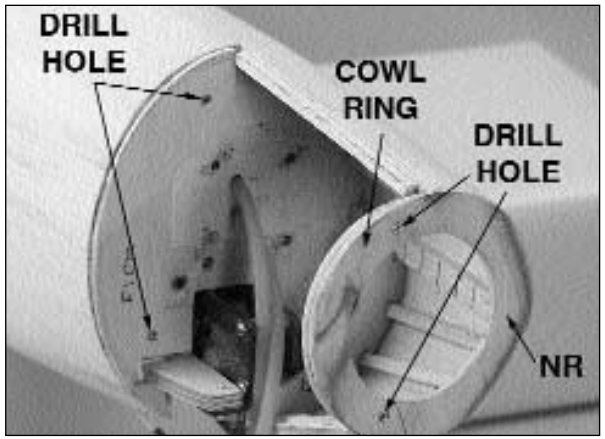
❏ 3. When you finish the covering and the cockpit installation (Follow the instructions included with the cockpit kit), paint the canopy and glue it in place on the fuselage. Be sure to follow painting recommendations on page 41 of this manual.

Cowling Installation

❏ 1. Locate the two die-cut 1/8" [3.2mm] ply **F1CM** parts. Glue the two parts together.



❏ 2. Cut the plastic cowl to fit the right side of the fuselage. Locate the die-cut 1/8" [3.2mm] balsa **cowl ring**. The cowl ring and F1CM will be used to mount the cowl to the fuselage.

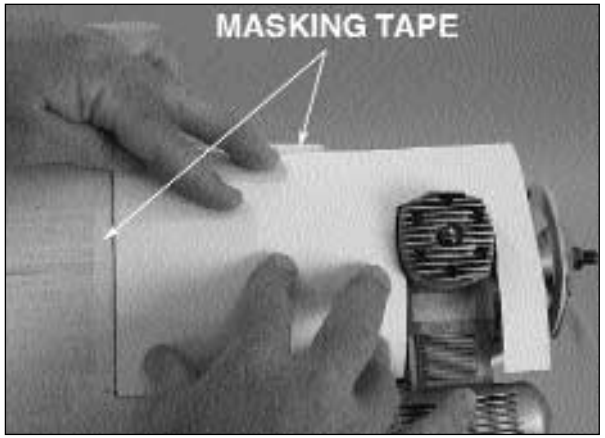


❏ 3. Position the cowl ring on the back side of part NR (the nose ring). Drill two 1/16" [1.6mm] holes through NR and the cowl ring. Re-drill the 1/16" hole in NR to 3/32". This will provide clearance when mounting the cowl. Be sure to only drill the clearance hole in NR, not the cowl ring. Counter sink the holes in NR. Screw the nose ring to NR with the #2 x 3/8" [9.5mm] wood screws.

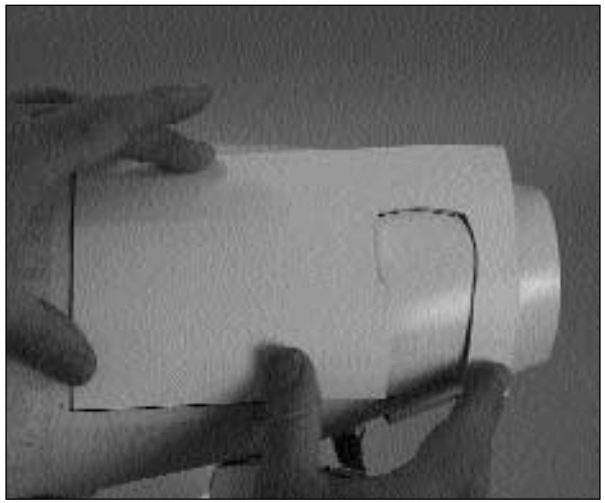
❏ 4. Position F1CM on the firewall. Drill two 1/16" [1.6mm] holes through F1CM and the firewall. Re-drill the 1/16" [1.6mm] hole in F1CM to 3/32" [2.4mm]. This

will provide clearance when mounting the cowl. Be sure to only drill the clearance hole in F1CM, not the firewall. Apply some thin CA to the holes in the balsa cowl ring and F1CM to harden them.

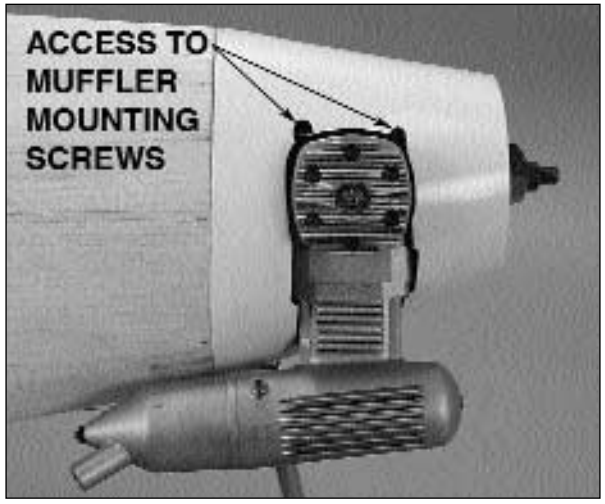
❏ 5. When the plastic cowl fits well to the fuse, glue the cowl to F1CM and the cowl ring. Be careful not to glue the cowl to the firewall or NR. **Hint**: slide some wax paper or part of a plan protector between the F1CM and the firewall and between NR and the nose ring.



❏ 6. Use poster board to make a pattern of the engine cut-out. Place masking tape under the pattern and trace the pattern. This will help you put it in place when the cowling is reinstalled.



❏ 7. Remove the engine and re-install the cowl. Put the pattern back in position and trace the shape to be cut away onto the cowl.



❏ 8. Cut out the area you masked on the plastic cowl. You will probably need to make some small adjustments to the cut-out area. Remove small areas at a time to get a good fit.
Hint: Do not cut the plastic cowl all the way through below the muffler. Make the cutout to fit the engine and muffler exactly. Mount the cowl over the engine and the install the muffler. Access to the muffler mounting screws is in the cut-out above the engine.

Mount the Receiver and Battery

We found there was more than adequate room to mount the receiver and battery in foam between the fuselage side and the wing saddle structure. We would recommend you do the same, holding the receiver and battery in place with #64 rubber bands.

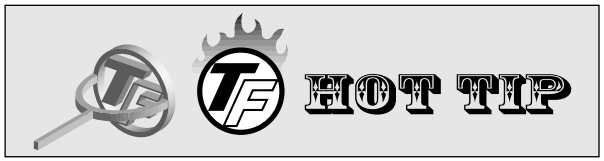
P-39 Fact

The Bell engineers wanted to mount the cannon so it would fire directly through the propellor shaft. This meant the engine would have to be located deep in the fuselage, behind the pilot. This, in turn dictated that the machine would have a tricycle gear--the first such ever used on a production fighter.

FINISHING

Prepare the model for covering

❏ 1. At this stage, there shouldn't be much left to do. We've installed the radio system along the way, all the hinge slots are cut and the control surfaces are all temporarily connected, the engine is mounted and the retracts (if you are installing them) have been fitted. If there are any areas left that you haven't fuelproofed, now is the time to do it. We recommend removing the engine, landing gear and any other systems that may get in the way of painting or fuelproofing. Make sure you fuelproof the inside of the flaps and the flap area in the wing, the wheel wells, the fuel tank compartment, the wing saddle and the front of the wing, etc. For fuelproofing, we recommend any kind of fuelproof model airplane paint but, of course, we prefer Top Flite LustreKote.® See the Hot Tip that follows on how to use LustreKote to fuelproof these important areas.
Note: You should always fuelproof the model before you cover it. Otherwise, some types of paint may soak through the wood and cause blemishes that may show through the covering.



If you plan to cover your model with Top Flite MonoKote film and you will be using Top Flite LustreKote spray paint for parts that require painting and/or fuelproofing, you may find it easier to apply LustreKote to some of those areas with a paint brush instead of spraying it from the can. To apply LustreKote with a brush, hold a tube (such as a drinking straw) to the spray nozzle, with the other end of the tube emptying into a container. Depress the spray nozzle until you have enough paint in your container to do the job. Spraying LustreKote into a tube will keep most of it from becoming airborne. Allow the paint to stabilize for about ten minutes before you brush it on. This is a handy method for painting visible areas on the outside of the model that require fuelproofing and must match your MonoKote finish (such as the wheel wells and the insides of the flaps). To simulate the Zinc Chromate used on the inside of aluminum airplanes, mix yellow and blue.

❏ 2. Inspect all surfaces for uneven glue joints and seams that require filler. Apply filler where needed. Many small dents or scratches in balsa can be repaired by applying a few drops of water or moistening the area with a wet tissue. This will swell the wood so you can sand it when it dries.

❏ 3. Final sand your entire model with progressively finer grits of sandpaper, finishing with 320 or 400-grit sandpaper.

❏ 4. Use a large brush, compressed air or a Top Flite Tack Cloth to remove dust from the model.

Balance the airplane laterally

❏ 1. Before balancing the airplane make sure you have the engine and all of the radio equipment installed.

❏ 2. Mount your wing.

❏ 3. With the wing level, carefully lift the model by the nose and the aft end of the fuselage under the stab (this may require two people). Do this several times.

❏ 4. If one wing always drops when you lift the model, that side is heavy. Balance the airplane by gluing weight inside the other wing tip. Do this by carving a cavity in the bottom of the balsa wing tip and filling it with the amount of weight required to balance the model laterally. Glue the weight in place with epoxy and cover the rest of the cavity with balsa filler. An airplane that has been laterally balanced will track better in most maneuvers.

Cover your model with MonoKote®

It is assumed that you are an intermediate to advanced modeler, so we won't go into many details on covering techniques, but here are some tips you should consider:

1. Most importantly, NEVER CUT THE COVERING DIRECTLY ON THE SHEETING. The P-39 depends upon the wood sheeting for some of its strength. Modelers who cut through the covering tend to cut into the sheeting and this will weaken the structure.

2. We recommend priming the plastic wing fillets, airscoop and exhaust stacks before covering the fuse, then apply color after you cover the fuse. This way you can "build up" the paint to nearly the same level as the covering for a nearly invisible transition between the two.

3. Use a Top Flite® Hot Sock™ for your Top Flite covering iron to minimize dents in the wood from your covering iron. You'll probably go through three or four socks by the time you finish covering your P-39. The Top Flite MonoKote Trim Seal Tool is highly recommended for this model due to the curved lines and fillets in the fairings and fin area.

4. Some modelers have three irons going at once: one on high heat without a Hot Sock for stretching the covering around curves like wingtips; one on medium heat with a Hot Sock for bonding the covering to large sheeted areas like the wing and stab; and a Trim Iron for small areas.

5. When covering large sheeted surfaces such as the wing, bond the covering in the middle and work outward, pushing out air as you proceed. Do not move the iron in a circular motion, but move it spanwise with the grain of the wood.

6. Areas that require an extraordinary amount of shrinking (such as the bottom of the fuse at the front) can be successfully shrunk tight with a heat gun. Use a glove to avoid burning you fingers.

7. When covering smaller parts with square edges such as the elevators and ailerons, cover the ends first with separate pieces of covering. Then, all you have to do is wrap the covering around the top and bottom and iron it down.

8. One method we like to use is to "pre-cut" the covering when possible to accurately fit the part, leaving "handles" in curved areas like the dorsal fin and the tip of the fin. Cover the main surface of the part and the straight lines of the leading and trailing edges first. Hold onto the handles as you heat the covering and wrap it around. Cut the handles off when you're done. You can use this method for the wing and stab too.

9. We recommend drilling or cutting small vent holes through the ribs in the ailerons, rudder and the elevators with holes on the ends of those parts to allow expanding hot air to escape while you cover. Otherwise, air sealed inside the control surfaces will expand and never allow the covering to fully shrink.

Covering sequence

Refer to the painting section that follows before you cover the fuse.

Fuselage

1. Stab bottoms, then stab tops
2. Fin
3. Aft fuse bottom
4. Forward fuse bottom (two pieces)
5. One fuse side, then the other (with the two halves joining in the middle of the top)
6. Bottom, then top of elevators
7. Rudder

Wing

1. Bottom, one side
2. Bottom, other side
3. Top, one side
4. Top, other side
5. Bottom, then top of ailerons
6. Bottom of flaps

Painting

We used **Top Flite LustreKote** for everything that needed to be painted or fuelproofed, except for the clear butyrate canopy. **Do not paint the clear canopy with LustreKote directly from the can, it can cause the plastic to curl. We recommend Formula-U for painting the clear canopy or the following procedure for LustreKote**. LustreKote spray paint will attack and cause clear butyrate plastic to curl. We have, however, developed a method you can use for successfully painting your canopy with LustreKote:

The recommended procedure requires that the paint be sprayed into a jar or plastic mixing cup. This is best done by spraying the paint through a small brass tube or straw into the jar. For best results spray no more than 1 oz. of paint into the jar at a time. As the propellant "boils off" it will cause the paint to foam slightly. Leave the paint in the open container, stirring every 15 minutes until no more foam appears on the surface of the paint and the paint has warmed to room temperature. This allows the propellant and some of the thinner to evaporate out of the paint. Depending on the amount of paint in the jar, this process may take about **1 hour**.

After allowing the propellant to boil off, use an airbrush to spray paint the canopy. If the paint is too thick to spray properly, it can be thinned with a small amount of lacquer thinner. The paint can also be brushed on, but brushing will not produce the high quality finish of spraying.

Earlier in the manual we recommended you prime the wing fillet, air scoop, gun pods and exhaust stacks before you cover the fuselage and add the color paint after you cover the model. To do it this way, first roughen the plastic parts attached to the fuse with 320-grit sandpaper, then spray on a coat of primer. After the primer dries, sand with 400-grit. Wet sanding works best because it keeps your sandpaper from becoming clogged, but of course you want to avoid getting the rest of the balsa fuse wet. You may wet sand if you are careful by shaking most of the water off your sandpaper after you wet it. Keep a cloth handy to wipe water from the balsa. After you are done wet sanding, allow the fuse to dry for a while, then dry sand it once more to smooth surrounding balsa that may have been wetted. Wet sand and prime the engine cowl too. Now the fuse is ready for covering.

To achieve the finish on the box we painted the MonoKote with Top Flite LustreKote. If you wish to copy the paint scheme, cover the whole model with #211 Dove Grey MonoKote. Lightly sand the MonoKote with 600 grit wet or dry sandpaper. This will help the paint adhere to the covering. Once the model is sanded, paint the airplane with Tan LustreKote (TOPR7216). Allow the tan to mist onto the grey bottom. This gives the feathered look that was common on camouflaged warbirds. After the tan has dried, paint the olive drab by making various shaped cutouts from poster board. Hold the cutouts away from the model approximately 1" to 2" and spray the olive drab over the tan. If you own an airbrush you can spray olive drab LustreKote (TOPR7210) into a small bottle and then use the paint in your airbrush. The airbrush allows you much greater control and you should be able to spray the camouflage markings freehand without the need for the poster board templates. Panel lines were applied using the Top Flite Panel Line Pen (TOPQ2510) following the instructions on page 42 in this manual.

When we had finished the panel lines and the application of all of the decals, the entire plane was given a coat of LustreKote Flat Clear (TOPR7199). When applying the clear coat start with a very light mist for the first few applications. Putting it on too wet will cause the panel lines to bleed. Multiple light applications is the best way to achieve a good finish.

For masking fine lines, use Top Flite Fine Line Masking Tape (TOPR8012) and use Kyosho® Masking Cover Sheet (KYOR1040) for masking large areas. **Lightly** use a Top Flite Tack Cloth (TOPR2185) to remove dust just before you paint.

Join the control surfaces

❏ 1. Start with the stab and elevators. Remove a small strip of covering from the hinge slots.

❏ 2. Fit the hinges in the stab or elevators only (without glue). Fill the elevator joiner wire holes in the elevators with epoxy.

❏ 3. Join the elevators to the stab with the hinges, simultaneously installing the elevator joiner wire in the elevators. If the hinges don't remain centered as

you join the elevators to the stab, remove the stab and insert a pin in the center of the hinges to keep them centered. Use a tissue dampened with alcohol to remove excess epoxy that comes out of the elevators. Make sure there is approximately a 1/64" [0.4mm] gap between the elevators and the stab so you do not glue them together.

❏ 4. Cut a paper towel into approximately 2" [51mm] squares. Add six drops of thin CA to the center of the hinges on both the top and bottom. The tunnels you drilled will wick the CA into the entire hinge surface. Use the paper towel squares to absorb excess CA from the hinge gap before it cures.

❏ 5. Use the same hinging method to join the rudder to the fin and the ailerons to the wing.

❏ 6. If you've built working flaps, use a toothpick to apply a small amount of petroleum jelly to the pivot points of the hinges to keep epoxy out.

❏ 7. Use a piece of wire or a toothpick to thoroughly coat the holes for the flap hinges in the wing and the flap with the epoxy. Coat one side of the flap hinges with epoxy and insert them into the wing. Coat the other side of the hinges with epoxy and join the flaps to the wing. Wipe away excess epoxy before it cures.

❏ 8. Tape the flaps in place to hold the flaps aligned with the TE spar until the epoxy has fully cured.

❏ 9. Reinstall all the pushrods and mount the control horns to the ailerons and flaps. Reinstall any hardware and other components you may not already have in place such as the engine and muffler, retract, fuel tank, servos, on/off switch, fuel filler valve, air filler valve, etc.

FINISHING TOUCHES

Decals

1. Study the photos on the box to decide where to place the decals.

2. Thoroughly clean your airplane before you apply the decals.

3. Trim the decals as close as practical and carefully apply them to your model. You can float the decals into position by first applying soapy water to the model's surface (just a teaspoon of dish detergent to a quart of water), then squeegeeing out the water and soap with a piece of soft balsa or a credit card wrapped with a tissue. Blot the surface dry and let the decal adhesive cure for at least 12 hours before running the engines.

Panel lines

No scale model is complete without panel lines. Panel lines really finish the job and set your model apart from others (besides, they tend to distract the eye from any building imperfections and uneven surfaces–not that your model has any!). Study the photos and documentation you have gathered and decide which panel lines to add. There are two methods for adding panel lines. The first method is to use a Top Flite Panel Line Pen (TOPQ2510) with a flexible straightedge. We used a piece of thin plastic so we could curve it around the fuselage. Apply a few strips of masking tape to the back of your straightedge about 1/8" [3.2mm] from the edge to raise it off the surface so the ink won't bleed underneath. Place the straightedge directly on your model and use it as a guide to mark your panel lines. Use the Top Flite Scale Template (TOPR2187) for rivets, hatches, fuel caps and other details. You can make your own templates from thin plastic or cardboard for special areas like the exit door or other hatches. Some cleaners will remove the ink lines, so test your cleaner on the ink before spraying the cleaner on your model. The inked-on panel lines stay well but have to be "freshened up" from time to time due to spilled fuel or exhaust residue.

The second method for applying panel lines is to use a Top Flite Smart Stripe™ to cut narrow strips of MonoKote film. Iron the panel lines in position. Black or Charcoal MonoKote film is recommended.

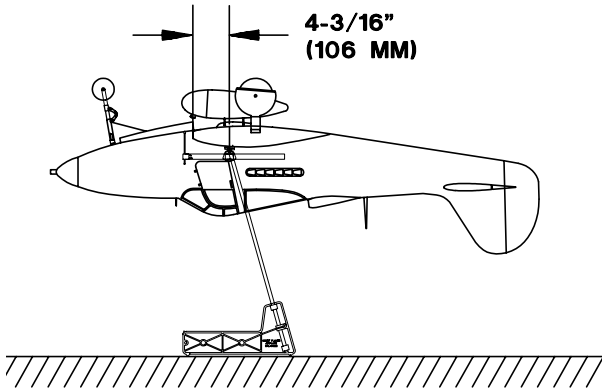
GET YOUR MODEL READY TO FLY

Balance your model

NOTE: This section is VERY important and must NOT be omitted! A model that is not properly balanced will be unstable and possibly unflyable.

❏ 1. Accurately mark the balance point on the top of the wing on both sides of the fuselage. The balance point is shown on the plan (CG) and is located 4-3/16" [106mm] back from the leading edge of the center section of the wing as shown in the sketch and on the plan. This is the balance point at which your model should be balanced for your first flights. Later, you may experiment by shifting the balance up to 3/8" [10mm] forward or back to change the flying characteristics. If you move the balance point forward it may improve the smoothness and tracking, but your P-39 may then require more speed for takeoff and become more difficult to slow for landing. If you move the balance aft it may make your P-39 more agile with a lighter feel and allow you to slow the model more for landing. In any case, please start at the location we recommend and do not at any time balance your model outside the recommended range.

❏ 2. All components should be in the model and it should be ready to fly but with an empty fuel tank.



❏ 3. With the wing attached to the fuselage, the landing gear extended (if you have retracts) and an empty fuel tank, lift the model at the balance point or place it on your C.G. Machine™ (shown in the sketch). If the tail drops, the model is tail heavy and you must relocate your battery pack or other components forward or add weight to the nose. If the nose drops, it is nose heavy and you must relocate your battery pack or other components aft or add weight to the tail. In order to save weight, relocate your battery pack and/or receiver or other components before you add additional weight to arrive at the correct C.G. You may install nose or tail weight by gluing lead weights inside the fuselage where necessary.

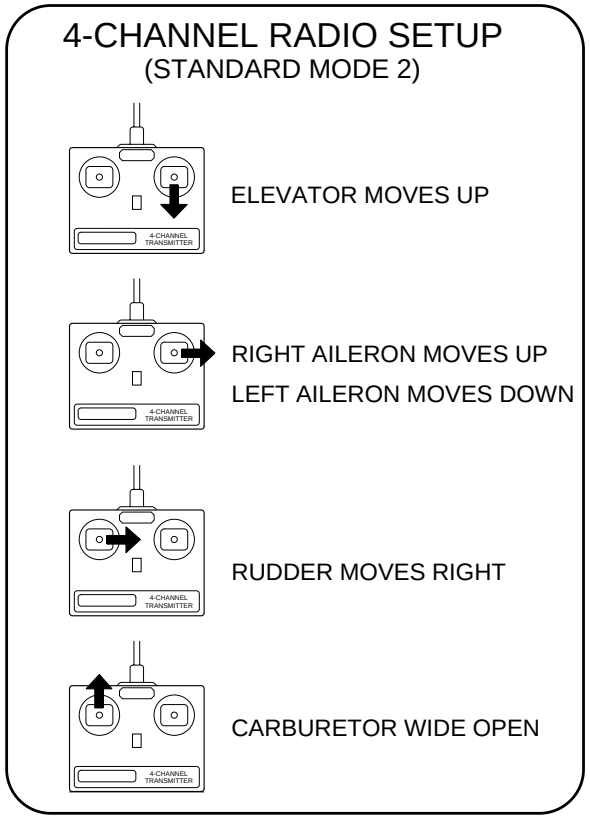
Note: The amount of weight required will depend on the engine, density of the wood provided and how heavily or lightly the tail was built.

Final hookups and checks

❏ 1. Take the servo arms off the servos, turn on the transmitter and center all the trims. Reinstall all the servo arms and secure them with the screws.

❏ 2. Double-check all the servos and make sure the servo arms are secure and all the clevises have a silicone retainer.

❏ 3. Make sure the control surfaces move in the proper direction as illustrated in the following sketch.



❏ 4. Adjust your pushrod hookups and set up your radio to provide the control surface movements as follows. Use a ruler or a Great Planes Accu Throw™ Control Surface Deflection Meter (GPMR2405) to measure the throws.

The balance point and control surface throws listed in this manual are the ones at which the P-39 flies best. Set up your aircraft to those specifications. If, after a few flights, you would like to adjust the throws or C.G. to suit your tastes, that is fine. Too much control surface throw can make your model difficult to control or force it into a stall, so remember...More is not better.

Recommended Control Surface Throws

	Low Rate	High Rate
Aileron	3/8" up 3/8" down [9.5mm]	5/8" up 5/8" down [15.9mm]
Elevator	5/16" up, 5/16" down [7.9mm]	1/2" up 1/2" down [12.7mm]
Rudder	1" left, 1" right [25.4mm]	1-1/2" left 1-1/2 down [38mm]
Flaps	2" down [51mm]	

PREFLIGHT

Identify your model

Regardless if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is required at all AMA R/C club flying sites and AMA sanctioned flying events.

Charge the batteries

Follow the battery charging procedures in the radio instruction manual. Always charge your transmitter and receiver batteries the night before you go flying and at other times as recommended by the radio manufacturer.

Balance the propellers

Carefully balance your propellers before you fly. An unbalanced prop is the single most significant cause of vibration that can damage your model. Not only will engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery. Vibration can also cause the fuel to foam, which will, in turn, cause the engine to run hot or quit.

We use a Top Flite Precision Magnetic Prop Balancer (TOPQ5700) in the workshop and keep a Great Planes Fingertip Prop Balancer (GPMQ5000) in our flight box.

Ground check your model

If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to inspect your radio installation and control surface set-up. Follow the engine manufacturer's instructions to break-in your engine. After you run the engine on your model, inspect your model closely to make sure all screws remain tight and your pushrods and connectors are secure.

Range check your radio

Ground check the range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control. Have an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test with the engines running at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, do not fly! Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell in your battery pack, or a damaged receiver crystal from a previous crash.

ENGINE SAFETY PRECAUTIONS

NOTE: Failure to follow these safety precautions may result in severe injury to yourself and others.

Store model fuel in a safe place away from high heat, sparks or flames. Do not smoke near the engine or fuel as it is very flammable. Engine exhaust gives off a great deal of deadly carbon monoxide so do not run the engine in a closed room or garage.

Get help from an experienced pilot when you are learning to operate engines.

Use safety glasses when you operate model engines.

Do not run the engine near loose gravel or sand; the propeller may throw loose material in your face or eyes.

When you start and run the engine, keep your face and body as well as all spectators away from the plane of rotation of the propeller.

Always be aware and very conscious of hand movements and be deliberate in your reach for the needle valve, glow plug clip, or other items near a spinning propeller.

Keep loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects away from the prop. Be conscious of pencils, screw drivers or other objects that may fall out of your shirt or jacket pockets.

Use a chicken stick or electric starter and follow the instructions to start your engine.

Make certain the glow plug clip or connector is secure so that it will not pop off or get into the running propeller.

Ask an assistant to hold the model from the rear while you start the engines and operate the controls.

Make all engine adjustments from behind the rotating propeller.

The engine gets hot! Do not touch the engine during or immediately after you operate it. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine and cause a fire.

To stop the engine, close the carburetor barrel (rotor) or pinch the fuel line to discontinue the fuel flow. Do not use your hands, fingers or any body part to stop the engine. Never throw anything into the prop of a running engine.

AMA SAFETY CODE (excerpts)

Read and abide by the following Academy of Model Aeronautics Official Safety Code:

GENERAL

1. I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations until it has been proven to be airworthy by having been previously successfully flight tested.

2. I will not fly my model aircraft higher than approximately 400 feet [120m] within 3 miles [4.8km] of an airport without notifying the airport operator. I will give right of way to and avoid flying in the proximity of full scale aircraft. Where necessary an observer shall be used to supervise flying to avoid having models fly in the proximity of full scale aircraft.

3. Where established, I will abide by the safety rules for the flying site I use and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

4. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.

5. I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind).

RADIO CONTROL

1. I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2. I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.

3. I will perform my initial turn after takeoff away from the pit or spectator areas and I will not thereafter fly over pit or spectator areas, unless beyond my control.

4. I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

FLYING

Takeoff

Take offs with this airplane are very straightforward and uneventful. Accelerate slowly and steer the plane down the centerline. One of the great benefits of a tricycle gear configuration is that it is not generally affected by torque like a taildragger.

Flight

The flight characteristics of this plane are very good at all ranges of the flight envelope. Slow speed flight is stable and shows no sign of tip stalling. Stalls are straight forward and gentle with the nose dropping straight ahead. The roll rate at the low rate is very scale like and predictable. Rolling at the high end of the recommended aileron throw will provide a much faster roll rate. As you get used to the plane in the first flight we think you will agree that the plane is stable, predictable and a joy to fly.

If you have installed the flap option we recommend that you get some altitude, decrease the throttle, and add the flap. Do some slow flying with the flaps down. When power is reduced you should see very little ballooning of the airplane. Flying with flaps should prove to be quite simple even if this is your first airplane with flaps. Our prototype was powered with the O.S. 61 FX. This power plant proved to have plenty of power for all maneuvers including loops and hammerheads.

Landing

If you have the retract option, don't forget to extend your landing gear! This is very important! The sink rate on this airplane is fairly slow, so don't expect it to drop out of the sky when you pull back on the power. We recommend that you make your approach from an altitude that would be typical for most sport airplanes. Reduce the power as you approach until you are over the runway threshold. Then pull off all the power and flair the plane to touchdown.

If you have installed the flaps we recommend a slightly different approach for landing. Set your landing approach a little higher than normal, deploy the flaps, point the nose at the runway and maintain that approach until you are over the runway. Pull the power off and flair to touch down. With the flaps you will find that the plane comes in very slowly. Be careful not raise the flaps during an approach. This could cause an abrupt loss of altitude.

Have a ball! But always stay in control and fly in a safe manner. GOOD LUCK AND GREAT FLYING!

Top Flite Drop Tank 108 Gallon

TOPQ7899

For more authenticity—both on display and in flight—install this scale version of the tank used by the full-size P-39 Airacobra. Top Flite includes hardware for attachment and in-flight release.

Top Flite Static Display 3-Bladed Propeller

TOPQ7907

Enhance your model's realism with this injection-molded propeller. It reproduces the 3-bladed style of the original warbird, in the correct scale size. For static display use only—not intended for flight.

Top Flite MonoKote

Strong, fuel resistant and easy to apply, MonoKote film's special adhesive shrinks drum-tight with just an iron or heat gun...and stays tight season after season! Choose from dozens of Flat Finish and high-gloss colors.

If you enjoyed building the Top Flite P-39, try one of these other outstanding .60 size Gold Edition kits as your next project.

Top Flite Corsair
TOPA0101

62” Wing span 7-9.5 lbs

Top Flite P-40E Warhawk
TOPA0120

64” Wing span 8-10.5 lbs

Top Flite P-51
TOPA0110

65” Wing span 8-10 lbs

Top Flite Spitfire MK IX
TOPA0140

63” Wing span 7.5-8.5 lbs

Top Flite Bonanza
TOPA0305

81” Wing span 11-13 lbs

Top Flite P-47D Thunderbolt
TOPA0135

63” Wing span 8.5-10.5 lbs

Top Flite 1/7 Scale Warbird Pilot
TOPQ9000

Make your cockpit come alive with this paintable WWII American pilot. Featuring fewer than a dozen pieces, it's made of a soft plastic that can be positioned in lifelike attitudes. Use it as a full body or pilot bust.

Top Flite P-39 Aira Cobra Cockpit Kit
TOPQ8408

This easy-to-install kit includes such precision-formed pieces as seat and instrument panel, as well as seatbelt material, decals for gauges and instruments, and more. Can be added to already assembled kits, too.

TWO-VIEW

Use this drawing or photocopy it and use the copies to plan your trim scheme.